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NONPROLIFERATION ISSUES

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BEFORE THE

SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND
SECURITY AGREEMENTS

OF THE

COMMITTEE ON FOREIGN RELATIONS

UNITED STATES SENATE

NINETY-FOURTH CONGRESS

FIRST AND SECOND SESSIONS

ON

NONPROLIFERATION ISSUES

MARCH 19, APRIL 16 AND 28, JULY 18 AND 22,
OCTOBER 21 AND 24, 1975; FEBRUARY 23 AND 24,
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NOTE: Sections of the hearing days of February 24 and March 15, 1976 have been deleted at the request of the Department of State. Deleted material is indicated by the notation "[Deleted]."

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NON-PROLIFERATION ISSUES

WEDNESDAY, MARCH 19, 1975

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 2:04 p.m. in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington and Javits.

Senator SYMINGTON. The hearing will come to order.

OPENING STATEMENT

Today, the Subcommittee on Arms Control, International Organizations and Security Agreements of the Foreign Relations Committee commences hearings on nuclear weapons proliferation.

These hearings will be conducted with an eye to the forthcoming Review Conference on the Non-Proliferation Treaty which is scheduled for Geneva in May.

The Review Conference, provided for by article VIII, section 3, of the treaty, is expected to examine the operation of the treaty with a view to assuring that its purposes and provisions are being realized.

For many countries, this Non-Proliferation Treaty has been a major political barrier to the acquisition of nuclear weapons. In light of recent disturbing trends in nuclear proliferation, however, there has been considerable concern as to whether or not the treaty will serve as a useful and workable instrument.

It is now clear that economic costs and technical restraints are no longer decisive in preventing the production of nuclear weapons by many additional countries. The recent Indian nuclear explosion demonstrated dramatically that a country can develop nuclear explosives without any economy-breaking national drive.

Nuclear explosives may soon be at the disposal of a growing number of governments, even nongovernmental groups such as terrorist and criminal groups.

Any such development could imperil the security of nations in ways that few have ever before contemplated. Our own nuclear forces, upon which we place our main reliance so as to deter a possible attack from another nuclear power, are not designed to protect our security in a world where nuclear-armed groups abound.

STATEMENT ON DANGER OF SPREADING NUCLEAR PROLIFERATION

In a statement on the Senate floor last week, I presented the danger of spreading nuclear proliferation, and will include this statement in the hearing record at this point in lieu of further introductory remarks.

[The information referred to follows:]

[From the Congressional Record—Senate, Mar. 13, 1975]

CONTROLLING THE CANCER OF NUCLEAR PROLIFERATION

Mr. SYMINGTON. Mr. President, 6 years ago, in considering the Treaty on the Non-Proliferation of Nuclear Weapons, we feared a world in which nuclear-armed countries would abound, a world in which the tons of plutonium produced by "peaceful" nuclear plants might be diverted to military uses, a world in which nuclear wars could be triggered in every corner of the globe.

We ratified the Non-Proliferation Treaty in hope of preventing such a world, but today its specter appears closer on the horizon.

Some nations appear less constrained in discussing nuclear arms ambitions than they did 6 years ago. And the states which supply nuclear technology to the rest of the world export atomic reactors and fuel as they do wheat, soybeans, and carrots.

Just 2 weeks ago the Defense Minister of Turkey, reacting to the U.S. arms embargo, boldly announced that his country has "plans to manufacture atom bombs." And not so long ago President Quadhafi of Libya observed:

"Soon the atom will have no secrets for anybody. Some years ago we could hardly procure a fighter squadron. Tomorrow we will be able to buy an atom bomb and all its parts. The nuclear monopoly is about to be broken."

More than 50 countries today have nuclear reactors. Not including the five nuclear powers—United States, U.S.S.R., Great Britain, China, and France—and India, which just recently exploded an atomic device, about 30 countries possess "weapons-quantities" of plutonium or highly enriched uranium which could be used in a bomb development program; and more than half of these have refused to ratify the Non-Proliferation Treaty.

We have been told that these countries lack the scientists and the sophisticated chemical reprocessing facilities necessary for separating fissionable material from reactor fuel waste.

However, we have also learned that the production of nuclear material for bombmaking does not require an elaborate commercial reprocessing plant; that a country intent upon nuclear weapons development could build its own plant, hire foreign scientists and within a year achieve the desired results. Some nations may already have built such facilities and begun to covertly produce and stockpile nuclear explosive devices.

The International Atomic Energy Agency may be able to "detect" possible diversions of nuclear fuel in reactors in 32 countries which have come under its inspection as a result of "terms of trade" set by exporting nations. But the Agency is often unable to inspect other indigenous facilities which could be used to build a bomb. India's nuclear program is a prima facie example of how nuclear explosive efforts can co-exist with "inspected" nuclear programs.

Moreover, the Agency would be unable to prevent "detected" diversions from occurring. A country planning to use Agency-inspected facilities for a weapons-building program might seek to evade Agency detection or simply refuse to allow Agency surveillance to continue.

Only 10 to 20 pounds of plutonium is necessary for making an atomic bomb with the same destructive power as the one dropped on Hiroshima. Yet today, close to 90,000 pounds of plutonium have been produced by commercial nuclear power plants—not including amounts used for the nuclear weapons programs of the Big Powers.

Five years from now some half-million pounds of plutonium may be commercially available throughout the world. As the amount of plutonium grows internationally so does the risk of its diversion from peaceful uses to weapons-development programs.

Worldwide diffusion of nuclear fuel also increases the opportunity for theft by criminal groups. The United States has improved security on its nuclear materials, but there will always remain much uncertainty on the potential strength and sophistication of armed zealots who might attempt nuclear theft.

We should be particularly concerned with the possibility of piracy of nuclear materials while in transport or in a foreign country where security measures might not be so effective as in the United States. And it is not inconceivable that an international black market in stolen nuclear materials—or even complete nuclear weapons—could develop.

Once nuclear fuel has been acquired other "parts" for bomb-making could be purchased through regular commercial sources. Atomic physicist Theodore Taylor has said repeatedly since 1966 that an individual without extensive background in nuclear science could build a nuclear explosive device by following directions found in publicly available documents. Moreover, according to Dr. Edward Teller, a scientist who helped develop the atomic and hydrogen bombs, between 100,000 and 1 million people now have the basic information to assemble nuclear weapons.

Furthermore, in regard to thermonuclear explosives, which would be much more difficult to build than fission explosives. Dr. Taylor has confirmed the following situation. Given appropriate knowledge, some of which is still classified, and the required amounts of nuclear materials, multimegaton thermonuclear explosives could conceivably be secretly assembled and prepared for use.

But perhaps less difficult than building a nuclear bomb would be stealing or "seizing" one.

The United States has some 7,000 "tactical" nuclear weapons stockpiled in European countries and thousands more in other countries around the world and aboard U.S. ships.

Reports during the past year have indicated that some of these weapons may not be well protected against potential nuclear thieves—especially those who may have the armed capability and intelligence information necessary to overcome security systems protecting these weapons.

The mere presence of such large numbers of nuclear weapons around the globe provides an ever-present risk of seizure—not only by criminal groups but host governments themselves. A change in government, or government policy, in a country where U.S. nuclear weapons are stored could lead to a takeover of these weapons. It is no secret that during the Cyprus crisis, which persists to this day, the United States has been concerned with the security of its nuclear arsenals in Greece and Turkey.

Security of nuclear weapons is not only a problem for the United States, also for France, Great Britain, the Soviet Union, the People's Republic of China—or any other country which has nuclear arms. Indeed all nations take the risk that the security and potential use of these weapons may be affected by the political stability of the countries that possess or store them.

It is ironic that the United States, which in the first instance sought to limit membership in the nuclear weapons club, has made possible, through its sharing of atomic technology, additional membership in that fearsome club.

President Eisenhower's Atoms for Peace plan in 1953 has resulted in an expanding web of nuclear cooperation agreements, today involving some 30 countries and two international organizations. France, Canada, Sweden, the Federal Republic of Germany, Great Britain, and the Soviet Union have joined the United States as exporters of nuclear reactors; and Japan, Sweden, and other countries may soon join this group.

There is little coordinated regulation among countries. Because nuclear export is a booming international business with much competitive bargaining, recipient countries can take advantage of the free market's best deal which often carries with it less stringent safeguards on nuclear material.

After India blew open the door to membership in the nuclear club, by diverting her peaceful technology to the manufacture of atomic explosives, other countries considering nuclear ambitions watched to see what impact this would have on the policies of the nuclear exporting nations.

In less than a month the United States proposed to sell reactors to Egypt and Israel. Yet only a ceasefire separated them from renewed war. Neither country had ratified the nonproliferation treaty, although, Egypt had signed it.

Only in response to widespread congressional and public reaction to the proposed reactor agreements did the United States insist upon greater "safeguard"

and security measures. Neither Israel nor Egypt has so far accepted the proposal.

Now France has stepped into America's place with her own proposal for selling Egypt a reactor. France is not a member of the Non-Proliferation Treaty. While France insists that a high level of "safeguard" and security conditions have been placed on her deal with Egypt, we hope this is so, for injection of nuclear technology into the Middle East—or any other area of confrontation—is a very risky business.

Iran—which is already buying billions of dollars of U.S. military hardware—has most recently negotiated the purchase of six to eight large nuclear power reactors from the United States; and, according to previous reports, has bought two reactors from France and two from West Germany. By 1985, Iran, reportedly, is planning to have 20 to 25 nuclear plants. This would give her a potential, if she had access to reprocessing facilities, to produce at least 800 or 1,000 atomic weapons per year.

To her credit, Iran along with 83 other countries has ratified the Non-Proliferation Treaty and undoubtedly desires to adhere to that commitment. However, we cannot ignore the fact that should developments imperil security in her region, Iran could feel pressed to consider exercising the option under article X to withdraw from the Treaty. Article X, we might add, has been of concern to many who view it as example of the treaty's inherent weakness.

There are other disturbing scenarios. If India pushes nuclear weapons development, Pakistan may feel impelled to do the same.

Additionally, India may now want to export her nuclear-explosive technology for "peaceful purposes." No doubt it was coincidence that 5 days after the Indian explosion Argentina signed a pact for "nuclear cooperation" with India.

Interestingly, one of the most distinguished journalists of Argentina, Mariana Grondona, writing in the December 18 edition of *La Opinion*, had this to say:

"Now with India the Atomic Powers are six in number. They would like to remain six. If we came to be the seventh, we would of course like to see no more than seven. The last one to arrive tries to close the door. That is only natural. But why should the door be closed in our face?"

And if Argentina, which like India has neither signed nor ratified the Non-Proliferation Treaty, were to develop a nuclear weapons capability, would not her rivals for pre-eminence in South America want the same?

In the Far East, we should note that Japan already has some 70 nuclear power reactors scheduled for operation within the next 10 years—which would mean a potential capability to produce thousands of atomic bombs per year. We know that Japan has a "nuclear allergy" and constitutional prohibitions against nuclear weapons development. She is also actively considering membership in the Non-Proliferation Treaty. But if nuclear proliferation continues and the balance of power in East Asia changes, this country might feel pressures to join the nuclear weapons club.

So much for the present and possible future. Now, what can be done to prevent nuclear arms from spreading like a cancer throughout the world?

Coordinated international action is essential. To that end, who will take the lead? If there is not action, and soon, the problem may become irresolvable.

This May the parties to the Non-Proliferation Treaty will be meeting in Geneva to review the treaty's operation. The review conference provides a not-to-be-missed opportunity for the administration to initiate actions designed to cope with these changing realities of the nuclear threat.

Nuclear suppliers might usefully meet in advance of the conference to discuss measures to regulate better the distribution of nuclear materials. Such a meeting should include France and West Germany despite the fact that both remain outside the treaty, for they are becoming major suppliers of nuclear goods.

Universal accession to the Non-Proliferation Treaty and membership in the International Atomic Energy Agency would seem to be a first step toward coping with nuclear weapons proliferation. Toward this end, we should also examine the possible security guarantees that could be given to insecure nations as an alternative to their going nuclear and encourage the establishment of nuclear-free zones—areas of the world where nations would renounce their intention to make or store nuclear explosive devices.

We should also consider linking certain programs and trade privileges to membership in the Non-Proliferation Treaty and subscription to International Energy Agency "safeguards." Membership could be rewarded not only by "nuclear cooperation," as envisioned by the treaty itself, but by other economic benefits as well.

A proposal for improving the international regulation of fissionable materials—one which has received wide support in the arms control community—calls for an international agreement that nuclear assistance by any State, whether or not party to the treaty, should go only to States which have agreed to accept International Atomic Energy Agency safeguards on all their nuclear programs.

Additionally, countries supplying nuclear fuel should consider a comprehensive plan to serve as enrichment, reprocessing and/or leasing stations for world fissionable materials. These stations could supply limited necessary amounts of fissionable materials in exchange for all reactor fuel waste, or lease nuclear fuel rods on a megawatt/day basis.

A system of leasing is favored by Dr. Harold Agnew, director of the Los Alamos Scientific Laboratory, who suggests that after the contracted number of days the nuclear rods would be returned to the supplying station. Dr. Agnew says:

"If a country simply wants power, then such a plan should present no problem; if they had something else in mind then we should know it at the outset."

We might also seriously consider the pros and cons of at least a temporary, internationally agreed "freeze" on further reprocessing of plutonium, pending the establishment of an effective system of international safeguards.

In addition to more effective controls on the use of nuclear fuel, we should devise an international system of protection for these materials; and, in this regard, consider broadening the function of the International Atomic Energy Agency to include setting security standard and implementing other international actions for nuclear materials security. At the least, the Agency could exercise periodic surveillance over nationally-operated security systems with a view toward recommending improvements in those systems and providing assurances to other nations concerning prevalent conditions of security.

Furthermore, it would be prudent for the United States and any other country which stores nuclear explosive devices in foreign lands to consider the potentiality that they may fall into the hands of criminal groups and be used for blackmail or hostage purposes. We should review our policy of placing thousands of tactical nuclear weapons abroad; we could withdraw the great bulk which are not required for international security purposes, and insure that the rest are adequately protected.

Finally, the nonnuclear countries remind us of article VI of the Non-Proliferation Treaty which requires the nuclear powers to undertake effective measures to put an end to their arms race. Whether measures responsive to this requirement have been taken remains at best an open question.

In the next phase of the Strategic Arms Limitation Talks (SALT), the United States should seek to negotiate reductions in nuclear weapons and restraints in qualitative improvements. If we fail to do this, we will further diminish any hope that other nations will refrain from seeking their own nuclear weapons.

A distinguished former diplomat from a nonnuclear country said recently at a conference in France, sponsored by the Carnegie Endowment and the Arms Control Association:

"If we had known in 1968 how little the nuclear powers would do over the next six years to meet their end of the Non-Proliferation Treaty bargain by controlling their own arms race, I would have advised my government not to sign the Treaty."

Clearly, the performance to date of the Soviet Union and United States in negotiating arms control agreements leaves much to be desired.

At the same time, if we are going to assist nations to take full advantage of the expanding uses of nuclear energy, we must have nothing to fear from its continued diffusion. We cannot allow nuclear "plowshares" to be beaten back into swords.

Now again we are at a critical juncture of history. In 1946, if the Soviet Union had been more cooperative, we could have adopted Bernard Baruch's plan to destroy all atomic bombs and place nuclear technology under strict international control. Today, in a far more complex nuclear world, it may no longer be feasible to achieve complete nuclear disarmament.

What can be achieved, however, are more effective ways to prevent the spread of nuclear weapons. This goal should be placed at least as high as any other on our foreign policy agenda and should be the subject of the highest level of international negotiations.

Toward this end, and in an effort to generate greater awareness and better understanding of the various problems involved in controlling nuclear arms proliferation, the Subcommittee on Arms Control, International Organizations and

Security Agreements, of which I am chairman, will be holding special hearings on March 17 and 19.

The hearings will examine some of the issues which are likely to arise at the Non-Proliferation Treaty Review Conference in May, as well as possible U.S. initiatives at the conference and other steps to advance nonproliferation.

WITNESSES

Senator SYMINGTON. Our witnesses today are Dean Adrian Fisher of the Georgetown University Law Center, who was instrumental in the negotiations leading to the Non-Proliferation Treaty, and who in my opinion knows as much about this subject as any American; Prof. Mason Willrich of the University of Virginia Law School, author of a number of highly regarded works on nuclear proliferation; and Dr. Theodore V. Taylor, a distinguished nuclear physicist, formerly associated with the Los Alamos Scientific Laboratory and now chairman of the board of the International Research and Technology Corp.

Each of these witnesses have been asked to comment on the current state of nuclear proliferation and suggest actions that could advance the goal of a nuclear-safe world.

Our first witness is Dean Fisher, and we look forward to hearing from you, sir.

STATEMENT OF DEAN ADRIAN FISHER, GEORGETOWN LAW SCHOOL, WASHINGTON, D.C.

Mr. FISHER. Thank you very much, Mr. Chairman.

I think at the outset I would like to put on the record what I do not think has been adequately stated up to now, and it is now almost 9 years since it happened, an occasion at the beginning of serious negotiations on the Non-Proliferation Treaty started in, really, August of 1966.

I conducted some of those prior to August of 1966, but in all candor, they were not negotiations; they were maneuverings. They were posturings, feints, and all the things one does, hoping the negotiations will get started, but recognizing they have not.

APPRECIATION OF SENATOR SYMINGTON'S EFFORTS REGARDING NEGOTIATIONS

Now, the reason for this time frame and the reason for the maneuvering, I think the record should show that the chairman was able to persuade the Soviets that we were serious in this area in a meeting he had with Ambassador Roshchin.

Senator SYMINGTON. What chairman was that?

Mr. FISHER. Chairman Symington of this subcommittee, with the cochairman of the ENDC (Eighteen-Nation Disarmament Committee), Ambassador Roshchin.

I think I would have to say in realism, not in modesty, but just straight fact, that I was unable to persuade him that we were serious in this area because of a lot of other things that were happening in the executive branch of the Government at the time.

I think you can mark August of 1966 as the beginning, and I would like to state publicly as an American, and then as a negotiator, my appreciation for the activities of the chairman of this subcommittee in persuading Mr. Roshchin and, through him, the Russian Govern-

ment, that we were not just maneuvering, were not just feinting, that we really meant business.

The whole tone of the negotiations of August 1966 was really quite different from what it had been before. Both of us got down to the serious business of negotiations, and got out of the silly business of propaganda.

I had occasion to read some of the statements I made as U.S. Representative in March and April of 1966, and I am frankly embarrassed by them. Ambassador Roshchin, if he reads his during that period, should be equally embarrassed.

However, beginning in the late summer of 1966, the tone changed decisively. We were both persuaded that the other was serious, and the treaty really is the result.

Now, I hate to use this analogy, but the late Jack Kennedy said, "Success has many fathers; failure has but one." But nevertheless, to the extent this is a success, and I hope it will be continued to be, I think you should be recognized—a terribly dangerous analogy—as one of its fathers.

NPT REVIEW CONFERENCE

Now, getting around to the Review Conference, we have this coming up in early May of this year as you stated, Mr. Chairman.

The purpose of the Review Conference was as the treaty states, to see whether the purposes of the treaty are being lived up to.

The critical nature of the review conference, however, is that many of the countries whose participation in the treaty is really of critical importance to the future health of the treaty have halfway completed the process of joining it. That is basically the Euratom—European Atomic Energy Committee—countries and Japan have signed and are sort of partially through their internal, and in the case of the Euratom countries, internal plus external, process of ratification, but they have not yet done it. They have not finally said, "We join."

So a nonproliferation treaty is a sort of a crossroads and a good Review Conference could provide it impetus for pushing these countries into positive action. A bad Review Conference could provide the impetus for saying, "OK, we have not done it, and we are not going to."

Now, let me consider the things that can happen that will be good, and those that will be bad, and I am not the optimist myself that states that the glass is half full, nor the pessimist that states it is half empty. But there are things that can happen that will be good. If they do not happen, they may be bad.

SECURITY ASSURANCE: U.N. SECURITY COUNCIL RESOLUTION

Let me first deal with the first problem, which is implicit in the Non-Proliferation Treaty and it is critical to many of the decisions made by countries whether to finally sign up or not. That is the issue of "security assurance."

Now, the current security assurance is in the form of a U.N. Security Council resolution and a series of statements made at the time that resolution was being adopted by the Security Council, and these were in effect a not terribly subtle way of the United States and the Soviet Union saying in effect to the Communist Chinese that, "If you

threaten India with nuclear attack, we will do something about it through the Security Council resolution.”

Now, one can argue whether or not that structure was good at the time. I personally think that it was. I am sort of stuck with it. I helped work it out.

On the other hand, one can no longer argue that a U.S. or U.S.S.R. joint arrangement directed against China is effective in the context of the Security Council because we got a new party—not a new party, but a new representative of a party there—who is not apt to be quite as relaxed on the veto as the party who was there in 1968; namely, the Nationalists.

So things have changed. The resolution I think has lost its validity. Some people say it was never good in the first place. But whether it was or not, it really doesn't have much impact now.

SECURITY ASSURANCE: NONUSE AGREEMENTS

So what should we put in its stead? Well, most people in this context think in terms of some form of negative assurance, that is, an agreement not to use nuclear weapons.

I have always felt that many of the arguments against such a negative assurance were really based on the assumption that we might need nuclear weapons to provide a support against the millions and millions of peoples, hundreds of millions, supplied by the Chinese Communist land forces.

That argument ceased to have any validity in October of 1964 when the Chinese Communists became a nuclear power.

So I can really see no reason why the U.S. should not be prepared to sponsor in, or in the context of, the Review Conference, an agreement by which the nuclear powers would make a pledge not to use or threaten to use nuclear weapons against a nonnuclear party to the treaty.

I would assume that realism would require that that pledge be qualified by a statement that it would not be applicable in the defense against a conventional attack launched in concert with, and active support of a nuclear weapons power.

This is the European problem.

No one assumes that East Germany and Poland and others would burst across the border unless they were acting in concert with the Soviet Union. That is what all the opposition is about.

I see no reason why that sort of negative assurance should not be made and I see much damage to the United States if, because of reasons which seem to me to be largely internal bureaucratic reasons, and partially cultural lag, some old “red-line” papers that said we cannot do it because the Chinese are probably still there, but notwithstanding developments of October 1964.

I think our refusal to do something like this would be very damaging to the prospects of the treaty. People would say, “Look, you won't even promise not to use nuclear weapons against us, and yet you expect us to agree not to develop them ourselves. What is this?”

So my first suggestion, Mr. Chairman, would be something in the field of negative security assurances, nonuse agreements.

I know we have a lot of conventional wisdom, probably some in papers I authored, that you can't trust a nonuse assurance because it can't be verified. You don't know it is being broken until it is too late. That is true.

On the other hand, if you have a worldwide nonuse, the nonuse commitment sort of fits into the overall context of deterrence, and a use of nuclear weapons against a nonnuclear party to the treaty who is not engaged in attacking in concert with a nuclear power fits in the same—it fits in the overall patterns of the deterrence relationship. We have a fairly good precedence for that, when President Kennedy said in the Cuban missile crisis that he would interpret an attack from Cuba on other Latin American countries as an attack launched by the country that had supplied the missiles.

So you can make a good “gamesmanship” argument that this is non-verifiable. You can make a good gamesmanship argument that deterrence is not verifiable, but it is what we live under and if you fit it into the total pattern of everything, the argument becomes a semantic rather than realistic one.

There are about three other proposals that I would make, Mr. Chairman, in this context.

ARTICLE IV OF TREATY: EXCHANGE OF INFORMATION

The most important one is the manner in which the United States lives up to its obligations under article IV of the treaty, in which we agree that all parties to the treaty should have the fullest rights to participate in exchange of information and involving nonexplosive—I will deal with the explosive devices later—peaceful uses of energy.

Now, that article and the article dealing with safeguards have been interpreted as not to prevent us from giving nuclear assistance to non-parties to the treaty, provided that all of the material that we provide is subject to safeguards.

Now, I am not suggesting that a reasonable man could not argue that the treaty permits that interpretation. One might use the old legal doctrine of estoppel, saying, I cannot suggest that because in this room before this committee, the full committee, in considering the ratification of the treaty, I said I thought that is the way it could be interpreted.

Senator SYMINGTON. Dean Fisher, if you will excuse me, I have to go vote, but I will be right back.

Mr. FISHER. Fine. Thank you.

[A recess was taken.]

Senator SYMINGTON. I am sorry for the delay, Dean Fisher, will you please proceed.

Mr. FISHER. Yes, Mr. Chairman.

Article IV of the treaty is fairly substantial as a commitment on the part of the nuclear powers in respect to other parties to the treaty in making nonexplosive, peaceful nuclear assistance available.

I think it is fair to say whether this article was presented to the United Nations by our representative, Ambassador Goldberg, its significance was not understated.

I think there probably is—and I think this is probably unjust—a little bit of a feeling that the benefits promised under article IV have

not yet been forthcoming. Some of the underdeveloped countries make that point. Perhaps they make it with a little bit—well, not fully realistic appraisal of the difficulties in actually making economic use of nuclear power. Apropos Calvert Cliffs, we are having trouble ourselves in terms of Vepco and others because of environmental concerns.

ARTICLE IV AND REVIEW CONFERENCE

On the other hand, there are two or three things with respect to this article that I think are important and that if the United States were to take a position on it might be helpful with respect to the Review Conference.

The first point is that our position that we really do not care whether other safeguards, other nuclear activities, of a nonparty to which we supply assistance are under safeguards or not so long as the materials that we supply are safeguarded, has a certain element of unrealism to it in terms of (a) the policies of whether it is worthwhile for a country to become a party or not; and (b) the actual application of safeguards.

You build up a nuclear industry by things that are safeguarded and then combined with indigenous nonsafeguarded material you build a bomb. I do not want to mention names, but that is what happened to the Canadians and Indians.

I do not think it would be wise to take the position that we will not supply nuclear materials to anybody unless that country is a party to the treaty. I think that would be interpreted as excessive pressure, the term "blackmail" would be used, and the possibility of getting French cooperation in there not picking up where we left off would almost be nonexistent. They would say, "We are not a party to the treaty, why should we do anything?"

However, the policy that commends itself is that we increasingly insist upon the total nuclear activity of the country being under IAEA safeguards, whether they are parties to the treaty or not, as a precondition for U.S. peaceful nuclear assistance.

I am aware Rome cannot be built in a day. We have a whole series of contractual obligations that enter into it.

On the other hand, that seems to me to be an objective that is reasonable and on which it might be possible to elicit French cooperation without—you cannot do it saying "unless you are a party to the treaty." The French would say, "How come, we are not a party." The French have said they do not intend to do anything that the treaty prohibited. They supported the IAEA—International Atomic Energy Agency—for example.

So the gradual trend toward the policy of requiring complete acceptance of IAEA safeguards as a precondition for further nuclear assistance by the United States would seem to me to be a worthwhile area in which to push recognizing you cannot do that tomorrow because we do have some contractual arrangements.

Now, second, in this area we probably should also try to work in the development of, by and large, colocation of critical elements of the fuel cycle and try to discourage a whole series of little independent fuel cycles.

We cannot make that as a condition in the case of parties to the treaty or people accepting the idea of safeguards. We cannot say "unless you colocate we won't do it because of the treaty." However, this would not be any form of a hedge on our obligations in article IV because colocation of the critical elements of the fuel cycle is really essential to the effective economic utilization of nuclear power. Therefore, it would seem to me that pushing in that direction would also be helpful both as a matter of the positive and the negative sides of article IV.

The positive side is the benefits of this nuclear power have to be made available to parties to the treaty and therefore that party is willing to accept IAEA safeguards as a pragmatic matter.

And the other side is that it makes this—and here I carry coals to Newcastle in the most gross way—I don't know what happened in the appropriations for the technical assistance under IAEA today. I gather it's on the Senate floor today or maybe now. I just hope that goes well.

I don't think we should confine all of our support to IAEA safeguards. We should also supply it to the positive portions of IAEA which is, after all, the use of nuclear energy for the benefit of mankind.

I think I have said about all I know about article IV, so I probably better stop.

ARTICLE III, PEACEFUL NUCLEAR EXPLOSIONS (PNE'S)

I would like to go on to article III which is peaceful nuclear explosions.

There I think we have a Frankenstein's monster, and we are the Frankenstein. In other words, we created this problem. When the treaty was negotiated, we were still engaged in active discussion of digging the Panama Canal by nuclear explosive devices.

We have since seen the error of our ways and by and large have called out really for cutting down on the, I gather so, for practically the nonfunding of the Plowshare program.

But we have made sort of contribution of, like Vice President Barkley's story of the boy playing the bass drum in the high school band who said he didn't play good music, but he drowned out a lot of bad. And we got some bad music that we have made that has to be drowned out.

We have given a lot of people the impression in many cases and the arguing point in other cases that Plowshare is a going proposition. We now realize that it is not, of course.

Now, how we get off that hook, I don't know, except I would hope we could continue to stop any Plowshares on our own and have a recognition, if you will forgive an amateur Biblical scholar from the Georgetown Presbyterian Church here, but there are two citations in the Bible to plowshares, beating your swords into plowshares.

That was Isaiah and Michael. But there is one in Joel that says the other, beat your plowshares back into swords and beat your pruning hooks back into spears, and they are both accurate because we all know the technology of a peaceful nuclear explosion is more sophisticated than the technology of the simple nuclear weapon.

Any country that develops a "peaceful nuclear explosion" has developed a weapons capability. It is only its intention and its word in telling the people that it deals with in the world that it doesn't intend to go nuclear in the weapons sense.

I have stated a problem and a dilemma and a certain amount of mea culpa with respect to Plowshare.

SOURCE OF 150 KILOTONS LIMIT

Senator SYMINGTON. I would like to ask just one question there to understand something.

Mr. FISHER. Yes, sir.

Senator SYMINGTON. Could you please clarify where the 150-kilotons limit came from?

Mr. FISHER. Well, as I understand it, Senator, the 150 kilotons was a threshold, and the initial threshold treaty of Plowshare explosions came out without a limitation. I gather that the administration wasn't adverse to that immunity from limitation, but was prepared to negotiate a Plowshare limitation of 150 kilotons if the Soviets would agree.

Initially under the threshold test ban, the peaceful explosions had no threshold on them. They were unlimited. So that there was a gap in the threshold test ban bigger than the ban itself because you can say this is peaceful and you could have tests in the megaton range.

PROBLEM WITH PLOWSHARE

The problem with Plowshare that I should perhaps indicate is that none of the economic studies of Plowshare cause it to make any sense if you blow one or two off per year.

All the economic studies that have thought about utility of Plowshare involve an incredibly large number of explosions, in the neighborhood of a thousand a year. And to have some sort of restriction on testing and what you can learn by testing in the weapons field, and say, OK, we are going to have a thousand a year of nonweapons tests, and we tell you they are nonweapons tests and you take our word for it, we won't let you find out, fellas—well, that seems to me to have a fairly big gap in it. That gets me, Mr. Chairman, to the problem of the final aspect of the treaty and that is, have we really lived up to article VI of the treaty?

ARTICLE VI, FURTHER NEGOTIATIONS AND FURTHER MEASURES OF DISARMAMENT

That says, we intend to pursue negotiations and further measures of disarmament and particularly the preambulatory references in the Non-Proliferation Treaty which say we hope to negotiate a comprehensive test ban.

Now, a group of largely nongovernmental types met in Divonne, France, just outside Geneva last September and formulated a consensus that the proposed threshold test ban with a threshold of 150 kilotons was "a disheartening step backward."

During the course of these conferences, we have these unofficial communiques worked out and there is sort of a consensus, but one of the members had objected to this characterization on the grounds it

was too negative. The chairman said, "What do you mean, 'it's too negative'? That was the nicest thing said about it. Others have said 'fraud,' 'fake.'"

The threshold test ban has no relationship to what we have always said we want to ban, all tests that we can detect.

Now, there are probably as many internal governmental memorandums over my signature in the years 1964 and 1965 favoring a fairly low threshold test ban, as that of any person then in the Government. But I must confess I think it is an idea whose time has long since passed. We have long since passed the point that that would be a worthwhile thing to do even with the threshold that directly related to detection capability which would be in the neighborhood of 5 to 10 kilotons, rather than just to go ahead and use a phrase that is now quite popular, "bite the bullet," and ban all tests and recognize the dangers of cheating from undetected tests were less than the dangers for nonproliferation of not having a test ban at all.

I recognize this presents us problems with the Chinese and maybe problems with the French. But it seems to me unless we are to adopt a "we can't get there from here" approach there is no reason for us not to start out in saying our objective is to ban all tests.

We would have to work out some arrangements to deal with the Plowshare problem. My own personal view would be a moratorium on any further Plowshare tests until a study has been made until we determine whether the game is worth the candle which I sincerely believe it is not.

But there have been other proposals, for example, one that would set up an international body to approve all Plowshare tests including those the nuclear power nations conducted in their own territory.

Second, and this can't be done between now and the Review Conference, it can't be completed, but there is required the willingness to go ahead further on SALT III; and putting all these things together with SALT II must be undertaken.

Perhaps adopting such things as restrictions on flight tests as one way of handling the MIRV—multiple independently targetable re-entry vehicle—problem and some further substantial reductions in instituting nuclear delivery system seems called for although I don't think it is realistic to expect those things to happen between now and May.

OTHER POSSIBLE DEVELOPMENTS BETWEEN NOW AND MAY

Other things could happen between now and May, just to review what I have suggested.

I think U.S. policy and nonuse of the type indicated could be developed between now and May and I think failure to develop it would be very, very dangerous.

I think a U.S. policy to increasingly insist on complete acceptance of IAEA safeguards and to lean very strongly toward the co-location of the nuclear fuel cycle facilities; and technical assistance programs; and a further statement that we really decided we didn't mean it quite that much on Plowshare and come up with an instruction to go back to the drawing board on the so-called threshold test ban—those could all be done between now and May.

I think the possibilities of a review conference which would tend to interest people particularly those critical countries that are all ready to go, OK, they would go. This, rather than to talk them out of it.

I think that would be substantially enhanced by those actions all of which are within the authority of the executive branch to take positions on between now and May and which an appropriate nudge urging or recommending by this august body might help them to make.

I think, Mr. Chairman, I have said about all I know so I better stop and try to answer your questions.

Senator SYMINGTON. Thank you.

POTENTIAL SIGNIFICANCE OF REVIEW CONFERENCE

Senator SYMINGTON. The Director of the International Peace Research Institute, Dr. Frank Barnaby, has said the future success of the Non-Proliferation Treaty will depend to a large extent on the outcome of the May Review Conference and that this Conference is, therefore, a crucial event in the field of arms control and disarmament.

Do you feel that you have expressed yourself on that adequately? Is there anything that you would add with respect to the potential significance of the Review Conference?

Mr. FISHER. Euratom and Japan are wavering in the balance and a good Review Conference will cause them to feel, let's go ahead and ratify it.

We have not fully dealt with the problem of the Indian test. I am not sure I can give you much in the way of wisdom that you do not already have on that.

But it would be awful if the Conference came out in such a way that either due to U.S. inability to accept negative assurances or some other things, that these countries then would say, "That being the case, we won't go along. We will call it off."

We have gone a long ways to get Euratom countries and Japan as far as they are and if there were to be any backsliding on this I think it would be a great step backward against peace.

SALT TALKS IMPLICATIONS ON COUNTRIES CONTEMPLATING NUCLEAR WEAPONS ACQUISITION

Senator SYMINGTON. A representative of a still nonnuclear country has said that if he had known in 1968 how little the nuclear powers would do over the next 6 years to meet their ends of the Non-Proliferation Treaty by controlling their own arms race he would have advised his government not to sign the treaty.

What Implications do you believe the SALT—Strategic Arms Limitation Talks—talks could have on countries now contemplating whether or not to acquire nuclear weapons?

Mr. FISHER. Well, my problem with the SALT talks is that it depends upon initially just what we do within the context of the Vladivostok accords. The Vladivostok accords permitted us to do just about everything we wanted to do and the Soviets to do just about everything they wanted to do. They were not the same things, so it permitted us to do things we had not wanted to do before that.

If we take the position that because it is permitted under the Vladivostok accords we have to do it and the Soviets take the same position, I think it would be a definite step backward.

My own view on balance is that the Vladivostok accord—and hopefully it will be clarified somewhat as we get to the details of it—would be on the whole, on balance better than nothing; it's better to have it ratified than not as long as there was the clear understanding that this agreement was not a hunting license under which everyone did what they could up to the maximum of the agreement, because the very terms of this agreement were basically a standstill. With respect to present plans, that is. And to that extent if we both decided to do not only what we wanted to do and what the other side decided to do and we had not decided to do—well, this would be a cruel hoax and this observation would be quite accurate.

To people who said if we had known you were not going to do anything about your arms control, well, you can take that with a grain of salt. It would be interesting to hear what the response of India would be to a comprehensive test ban.

PRICE PRESSURE TO ENCOURAGE MEMBERSHIP IN NPT

Senator SYMINGTON. Do you believe that price pressures on nuclear fuel to encourage membership in the Non-Proliferation Treaty for the peaceful proliferation of such energy would be in our best national interest?

Mr. FISHER. Well, I am not sure I would put it on the economics of the price for fuel as I would put it on the notion of the complete acceptance of or increased acceptance of IAEA safeguards and the problem of colocation of the fuel cycle facilities which do have certain economics to them.

I am not close enough to know when pressure becomes blackmail, at least in the eyes of the receiver, so to speak, the one receiving the pressure.

As I say, and have said earlier, I took the position some years ago that the treaty itself did not require treaty compliance for any form of nuclear assistance. I repeat that now, because the person to whom I made that answer—and it was Senator Javits—is in the room now.

But I think we might stiffen up the beat a little bit in terms that we don't have any obligations with respect to nontreaty parties. If they are not a member of the treaty, our treaty obligation is non-existent. So as a matter of policy we can say that we think the whole concept of safeguards would be that we do not want to build up the nuclear industry, safeguarded nuclear industry only to have a non-safeguarded domestic facility go nuclear in terms of weapons.

As a matter of policy we can do that much. I think we would make a mistake in interpreting the treaty that way. I don't think you would have gotten signatures by the Euratom countries or Japan either. On the other hand we don't have to adopt a U.S. policy to aid non-parties. There is no treaty obligation to go this way. So I put the emphasis on the IAEA safeguards and the colocation of fuel cycle facilities. I have not really thought about the pricing to that extent to give you a sensible answer though, Senator.

SPECIFIC INTERNATIONAL SANCTIONS AGAINST COUNTRIES DEVELOPING OWN
NUCLEAR WEAPONS

Senator SYMINGTON. Should there be specific international sanctions against nations moving to develop their own nuclear weapons?

Mr. FISHER. Well, I think the international sanctions would be awfully hard to—well it is difficult to say that. I think we can take the position that certainly in our own area as far as international nuclear cooperation is concerned when a country decides to go in a weapons direction we change our sense of collaboration with them in a nuclear way.

Now, whether or not you apply that to other forms of sanctions in terms of economic sanctions I think depends on the political relationships that exist at that particular time.

I have no doubt at all, however, about making a complete change in our nuclear policy of nuclear assistance with respect to a country that has indicated that it is going to go ahead with respect to nuclear weapons.

GUARDING AGAINST NUCLEAR REACTOR RECIPIENTS MOVING INTO WEAPONS
PROGRAM

Senator SYMINGTON. How much does the United States guard against the danger that the recipient of nuclear reactors and material and technology will decide as a result of internal political change to ignore safeguards and prohibitions and move into a nuclear weapons program?

Mr. FISHER. Well, Senator, if we have complete acceptance of IAEA safeguards I think it is a risk we have to take. The alternative is to tell the other countries that the nuclear age is not for you because we don't trust you.

While I am completely conscious of the dangers that they may say, "OK, we have now gotten to the point where we can throw the safeguards out, and you can do what you think you can to us," and you can't do anything at that point, but that is not as great a danger as trying to tell the nonnuclear countries that the nuclear age "is not for you; we don't trust you." If we do that, they will go nuclear on their own.

So I think we have to rely upon the structure of the treaty and the IAEA safeguards structure and continue to work to improve them. I think we made that decision when we signed the treaty and ratified the treaty and with article IV in it, by the way.

Article IV is based on the proposition that if you add the safeguard structure you will have to take the risk that a peaceful country will pull out of the treaty later on. But there are other sorts of pressures to prevent that and I don't think we can change our minds on that and have any hopes of widespread adherence to the treaty.

OPTIONS AVAILABLE SHOULD MEMBER WITH FUEL STOCKPILE ABROGATE NPT

Senator SYMINGTON. What would we do in a situation in which a member nation of the Non-Proliferation Treaty with a stockpile of irradiated fuel elements decided to abrogate the Non-Proliferation

Treaty? What should we be doing to improve our choices should this occur?

Mr. FISHER. Well, Senator, if you have—well, one of the reasons for colocation preferably on a regional basis of the entire fuel cycle is to make that option a harder one to exercise. It doesn't become purely a national decision.

I think we have a basis for doing that not only in the Non-Proliferation Treaty itself but in the economics of the fuel cycle.

I know there are many dangers in the Non-Proliferation Treaty, but again I come to my basic philosophy that they are outweighed by the fact that if you took the view of potential nuclear countries that the nuclear age is not for you, you wouldn't have a Non-Proliferation Treaty. Those dangers would be greater.

Senator SYMINGTON. Thank you.

DIVONNE CONFERENCE CONCLUSION CONCERNING ARTICLE VI

At the Divonne conference last year sponsored by the Arms Control Association and the Carnegie Endowment for International Peace the following was a principal conclusion and I quote:

The nuclear-weapon parties should begin to fulfill their obligations under Article VI of the NPT to "pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, including a treaty on general and complete disarmament." In particular, they should initiate a substantial reduction in strategic nuclear delivery vehicles, pursue measures to limit further missile flight testing, and, most importantly, proceed promptly to negotiate a Comprehensive Test Ban.

Would you comment on that?

Mr. FISHER. Well, my only comment on that, and I agree with this recommendation, but as you indicated I was at Divonne and participated in drawing this up. Also, and at an appropriate point I would suggest the committee might like to have this report as an appendix to whatever hearings it prints.

Senator SYMINGTON. Without objection, we will include that.

[The information referred to follows:]

REPORT OF THE CONFERENCE OF DIVONNE; NPT: PARADOXES AND PROBLEMS

(Anne W. Marks, Editor)

RECOMMENDATIONS AND CONCLUSIONS

It was the general view of the participants at Divonne that they should focus on the upcoming NPT Review Conference and seek to provide recommendations which might gather enough support to be felt there. A series of recent developments has underlined the urgency of the issues to be discussed at that Conference. Our discussions covered many aspects of the non-proliferation issue beyond the framework of the Treaty, some of which were felt to be of great significance for the constraint of proliferation and the reinforcement of international security.

The recommendations and conclusions presented here are based on a generally held view that the present Treaty, while far from perfect, is a useful and workable instrument. Two questions nevertheless confront the Review Conference: the question of amending the existing Treaty text, and the question of implementing its provisions. It was widely argued that attempts to amend the Treaty in a substantive fashion at the Review Conference are likely to prove ineffective. At the same time, it was felt that the most notable shortcomings in the present operation of the Treaty clearly result from the failure of the nuclear-weapon parties to carry out its provisions and to fulfill obligations undertaken by them at the

time of its negotiation. The recommendations which follow are therefore directed particularly to steps which can help to ensure that the purposes of the Treaty and its Preamble are realized.

1. THE ARMS RACE

The nuclear-weapon parties should begin to fulfill their obligations under Article VI of the NPT to "pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, including a treaty on general and complete disarmament." In particular, they should initiate a substantial reduction in strategic nuclear delivery vehicles, pursue measures to limit further missile flight testing, and, most importantly, proceed promptly to negotiate a Comprehensive Test Ban.

* * * * *
 To meet their obligations under Article VI, the United States and the Soviet Union must take more positive action than has been evidenced so far. Three steps in particular are of major importance.

First, the actual process of general strategic disarmament must begin with reducing the number of strategic nuclear delivery vehicles. We are confident that an immediate and substantial reduction in numbers of strategic nuclear delivery vehicles would pose no threat to the security of either side, and would set in motion the mechanism for a firm schedule of further reduction.

Second, measures to limit or prohibit further qualitative advances in the strategic arms race must be combined with such reductions. Strict limitations in the numbers of missile flight tests will make the capacity of either side to develop new MIRVs or increase accuracy on their missile warheads (both potentially destabilizing steps), significantly more difficult. Such controls can be readily verified through national technical means, as established by the SALT Agreements of May 1972.

Third, a Comprehensive Test Ban. The absence of a total ban on testing continues to symbolize the failure of the nuclear superpowers to exercise restraint in arms development, in particular in the technological nuclear arms race. The recent signing of the "threshold" test ban treaty by the United States and the Soviet Union was a disheartening step backward, for instead of evidencing an intent to stop nuclear testing over time, it appears to license it. A threshold of 150 kilotons yield (ten times the size of the Hiroshima bomb) permits the development of most weapons the U.S. and U.S.S.R. are likely to want. In setting an effective date of March 31, 1976, the agreement permits testing of those larger weapons which would be outlawed after that date. In authorizing "underground nuclear explosions for peaceful purposes" without any restriction, the parties are raising problems which are discussed under Recommendation 3.

While efforts must continue to get France and China to join the negotiations for a Comprehensive Test Ban, their failure to do so should not be allowed to hold up agreement. Provisions similar to those in earlier arms control agreements can always be included to allow the parties to withdraw if continued testing by non-parties vitally affects their security.

2. SECURITY AGAINST NUCLEAR THREATS

As the U.N. Security Council Resolution 255 and the associated declarations on security assurances are widely regarded as inadequate, and, in the opinion of many states, meaningless, the nuclear powers should be prepared to take more realistic action, including at least an offer along the lines of a pledge of an appropriate type not to use or threaten to use nuclear weapons against a non-nuclear party to the Treaty. Regional moves toward nuclear-free zones patterned along the lines of the Treaty of Tlatelolco should also be encouraged as another means of allaying fears of nuclear threats.

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 A major concern of the non-nuclear-weapon states during the negotiation of the Non-Proliferation Treaty was the extent to which their commitments under the Treaty would weaken their national security, leaving them prey to nuclear aggression. The nuclear powers responded to this problem of nuclear insecurity with the tripartite Security Assurances Resolution, adopted by the UN Security Council on June 19, 1968. Even then, this measure fell short of what many non-nuclear-weapon states thought necessary. Moreover, at the present time, it is generally agreed that it has no practical value. International events since that time have undermined the effectiveness of the resolution to the point where it

has lost all practical value. It is imperative that consideration be given to alternate forms of security assurances, or arrangements which can more adequately allay the real fears of the non-nuclear-weapon parties and take into consideration the problems of some non-parties. Two possible solutions which have often been discussed at the international negotiating table deserve serious attention.

One possibility involves a pledge by the nuclear powers never to be the first to use nuclear arms against a non-nuclear-weapon party to the Treaty unless that party is engaged in armed attack in concert with a nuclear-weapon power. Such a non-use undertaking on the part of the nuclear powers would meet the specific demands of various non-nuclear non-parties. Moreover, so far as the nuclear powers are concerned, it involves no more than an extension of their commitments under the Treaty of Tlatelolco (the Treaty for the Prohibition of Nuclear Weapons in Latin America). A precedent can be found in Protocol II to that Treaty in which four of the nuclear powers have pledged to respect the nuclear-free zone established in Latin America and not to use or threaten to use nuclear weapons against the member states in the zone.

The formulation suggested for the pledge would automatically make exception in the case of conflict embarked upon by a non-nuclear weapon state formally allied to a nuclear-weapon power, if that power undertook supporting military movements. On the other hand, it would protect non-nuclear-weapon parties from the threat of nuclear blackmail in the pursuit of their national security policies. There have been a variety of other non-use agreements discussed, ranging from an absolute agreement to one which does not apply to any allies of a nuclear power.

The proposals have been discussed in the context of agreed types of non-use pledges to parties to the NPT because that is the context which is now under consideration. This does not preclude negotiation of an agreed type of pledge of more general application in another forum.

Another approach to alleviating national security problems posed for non-nuclear-weapon nations surrendering the nuclear option is a regional one, that of nuclear-free zones. The experience of negotiating the Latin American Nuclear-Free-Zone (The Treaty of Tlatelolco) has shown that proposal for denuclearization in various parts of the world have the advantage of treating separately the special political, strategic, and technical problems of each region. Above all, such zones can offer increased security because they are negotiated among the states involved.

Mutual assurances of the renunciation of nuclear weapons in a given area, with provision for satisfactory verification, can provide more security than pledges by the nuclear-weapon state alone. Proposals for Middle East and South Asian nuclear-free zones have recently been made. The African states may wish to pursue a similar project. Proposals for nuclear-free zones have been made in Europe. The great powers should respect such zones as agreed upon.

3. "PEACEFUL" NUCLEAR EXPLOSIONS

In view of the differing understanding of the value and practicality of "peaceful" nuclear explosions (PNEs), a study should be made by a group of experts appointed by the Secretary General of the United Nations to examine the political, safety, security, economic, and technical aspects of the PNE program. This group should include the varied disciplines necessary to make a broad study and should be initiated without waiting for the Review Conference.

Two suggestions were made in this context: namely, that a moratorium on all further PNE tests be imposed pending the results of this study, and that there be an international regime to supervise all peaceful nuclear explosions of all states, should they be continued or resumed. However, there are some who would support one or the other of the two suggestions only in the context of the control of military uses of nuclear energy, including a Comprehensive Test Ban.

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At the time the NPT was signed in 1968, there were high hopes in some quarters that the economic benefits from the use of peaceful nuclear explosives might turn out to be impressive, and Article V was placed in the Treaty to ensure that the non-nuclear-weapon countries would enjoy any potential benefits on a non-discriminatory basis. It was pointed out, however, that in the intervening six years the United States had spent many millions in pursuit of practical, economic applications for its "peaceful" explosions program ("Plowshare"). Despite this

and despite the fact that the U.S. has had intensive experience with this particular technology, no particular success has been achieved.

There continues to be controversy on the real potential of PNEs and there are not sufficient analyses available about the costs, numbers of explosives needed, alternative methods of doing the tasks, or the environmental and health risks to settle the argument. Moreover, since PNEs and nuclear weapons can only be differentiated by their intent, such explosions raise serious problems for effective nuclear arms control.

One view expressed was that PNEs were incompatible with nuclear arms control and should therefore be prohibited altogether. Another view was that it was not practical or acceptable to prohibit PNEs, especially for the developing countries, unless all nuclear tests were forbidden. But this latter was acceptable, according to still another, only if safeguards were to be applied to the peaceful nuclear activities of *all* powers.

In view of the divergencies of opinion about the value and practicality of PNEs, proposals were made that a broad new study be undertaken by the UN Secretary General of the potential benefits and possible disadvantages that might result from a program of peaceful nuclear explosions, and that every peaceful application be evaluated in terms of alternative methods of accomplishing the same purpose. All information, except the details of explosive design, should be freely available to all interested parties, in order that every nation be on an equal footing in determining its true national needs.

It was pointed out by one of the participants that the International Atomic Energy Agency was required under its Statute to carry out such studies, and also that the United Nations had been holding a series of conferences on the peaceful uses of nuclear energy, including PNEs. Nevertheless, there was general support for the study proposal, providing it considered—in addition to the technical aspects—the political, safety, and economic questions involved. If and when, after the study, “peaceful” nuclear explosions were considered feasible and desirable, it was proposed that they be carried out under an international regime.

In any event, it was agreed that should the proposal for a study be implemented, it need not—and indeed should not—await the convening of the Review Conference. And in the meantime, it was proposed, a moratorium should be declared on all such “peaceful” nuclear explosive tests, although some did not accept the idea except in the context of a ban on all nuclear tests.

4. CIVILIAN NUCLEAR ASSISTANCE

Article IV of the Non-Proliferation Treaty recognizes the “inalienable right” of all parties to full participation in all peaceful nuclear activities, except for the manufacture of nuclear explosive devices. In order to avoid discrimination between party and non-party states, nuclear assistance by any state (whether or not party to the Treaty), in the forms of nuclear material and technology, should go only to non-nuclear weapon states which have agreed to accept approved IAEA safeguards on all their peaceful nuclear programs.

* * * * *

Included in the Article IV pledges of assistance and cooperation is an undertaking by parties “in a position to do so” to contribute to civilian nuclear applications of the non-nuclear-weapon states, and particular mention of the needs of the developing countries is made. These provisions were included in the Treaty in response to complaints about its nuclear-nonuclear weapons imbalance and to encourage accession by the promise of assistance to NPT states.

The drafters of the NPT doubtless saw the entry of power reactors into national energy economies taking place at a somewhat less rapid pace than the oil crisis now seems to permit. The heightened interest and activity in nuclear power as a large part of the answer to worldwide energy demands has brought the issue of compliance with the commitment to assistance in this technology into sharp focus.

The NPT places primary emphasis on preventing the diversion of nuclear materials from civil to weapon use. Today, however, the nuclear-weapon states (who along with certain non-nuclear-weapon states, are major suppliers of nuclear fuels for civil use) cannot continue to regard the Treaty in such narrow terms; a healthy treaty must take into account the commercial and economic possibilities inherent in civil use, and must place as strong an emphasis on the exploitation and sharing of benefits as it does on the responsibility for its potential dangers.

The fuel produced in uranium enrichment facilities is essential for the operation of most nuclear power plants in operation now and until the end of the

century. States relying on nuclear fuel for power resources have been dependent for years on others (particularly the United States) for the fuel essential to the operation of their power plants. Articles III and IV of the NPT, read wisely together, can provide a framework (through the establishment of a system of international participation in critical elements in the fuel cycle) on which national security, safety to peoples and their environment, and economic independence from fossil fuels can be built.

The NPT safeguards requirements are not designed to accomplish all this, nor should they be. What they can do, and in fact are beginning to do, is place in motion a process that demonstrates that controls can be made to work, and much less intrusively than was originally thought. The responsibility assumed by the International Atomic Energy Agency under the Treaty, and the technical and political effort required to fulfill it, has already produced a unique and creative dichotomy between national and international entities engaged in the development of nuclear energy. Building on what has been done so far, it is possible to develop a system for multinational participation in, and international supervision of, the critical elements of the fuel cycle which will give to the parties to the NPT the assurance that they can obtain, on a non-discriminatory basis, the materials and facilities necessary for their power programs.

Parties to the NPT in a position to supply nuclear assistance should discontinue a practice which has the effect of discriminating *against* the non-nuclear-weapon states that have become parties to the NPT.

Non-nuclear-weapon parties to the Treaty have agreed to accept safeguards on *all* source or special material in *all* peaceful activities, while at the same time such materials are being sold by some parties to countries not party to the Treaty under safeguards applying *only* to the particular materials being transferred.

There was discussion whether this practice is in violation of Article III. Opinions have been expressed on both sides of the issue, but no matter which view is correct, the practice is inconsistent with the purposes of the NPT. It serves as a disincentive to states joining the NPT. It also tends to undermine the effectiveness of the safeguards system itself. In the first place, safeguards are more effective when they are applied to *all* nuclear facilities inside a state.

Some participants argued that parties to the NPT should supply no nuclear materials except to other parties and that a concerted policy of all supplier countries is desirable to avoid the misuse of supplies.

It was also suggested that there should be a prohibition of any exchange of nuclear materials and technology between parties and non-parties to the NPT. This would provide an inducement for potential suppliers of nuclear materials and technology to adhere to the Treaty.

Another view was that in order to eliminate the existent discrimination between nuclear-weapon states and non-nuclear-weapon states parties to the Treaty, all recipients of nuclear equipment, whether weapon-states or not, should accept the same safeguards.

It was also suggested that in order to remove obstacles to the formation and operation of multinational owned nuclear enterprises and in order to facilitate the extension of IAEA safeguards to as much of the world's nuclear industry as practicable, nuclear assistance should be provided only if such materials and equipment (and all materials produced with such materials) were subject to IAEA safeguards.

One view was that a much more serious discrimination in the Treaty lay in the provision which required safeguards on *all* nuclear programs of non-nuclear-weapon states, while there were no safeguards at all on any programs of nuclear-weapon states. Such a provision, it was argued, discriminates against developing and non-industrialized countries unable to manufacture their own requirements indigenously.

The Conference recommendation adopts a middle ground and takes the position that, in the future, transfers of nuclear materials to non-parties should be under the same conditions as apply to NPT parties—safeguards on all materials in *all* peaceful activities.

5. SAFEGUARDS

International and national safeguards systems should be strengthened and made universal. Physical security should be introduced into the system by incorporating appropriate physical security standards which must apply on all materials. Consideration should also be given to safety and environmental concerns.

* * * * *

It is clear that safeguards, whether applied to the narrow purposes of the NPT, or to the broader, more comprehensive questions accompanying the era of nuclear power, are destined to become a commonplace of nuclear life.

The problem of diversion of nuclear material by terrorists, organized criminals and other non-governmental groups should be given immediate attention. Since there is no doubt that under certain circumstances the possibility of such diversion exists, the risks to the growing nuclear industry and international security are manifest. NPT safeguards, which are aimed at detecting governmental diversion, contain no provision against theft or sabotage by private groups or individuals, and means must be developed to deal with these problems. Regardless of attitudes towards the NPT, all governments have a common interest here, which can logically be addressed through the IAEA. For although the IAEA cannot itself exercise police power, it can, in the new spirit of cooperation between national and international systems, formulate certain standards of physical security which must be applied if nations are to be considered in compliance. The same concern should be applied to industrial accidents and safety standards for handling highly toxic materials.

Mr. FISHER. The particular points they make are substantial reduction in nuclear delivery vehicles, pursue measures to limit further missile flight testing and most importantly, negotiate a comprehensive test ban.

Those are the things that can be done fairly quickly, particularly the latter.

Now, there is a reference to general and complete disarmament and that remains the objective of the United States. We all know it is an objective that is not right around the corner. I have always been a little bit concerned about people who say, "Well, this is not worth doing because it is not general and complete for disarmament."

I think a comprehensive test ban would be a great thing for peace whether it is done within the context of the complete disarmament objective or not.

A Senator used to say, "The test ban is not disarmament at all."

Well, I don't care whether it is or not, it is still a great step for peace.

I would hope those three measures which represented the consensus of the group, most of them not officials although some officials were there—by the way, no U.S. officials were there—but as to what is doing. These are the ones that seem most important and that is the reason for the emphasis on the comprehensive test ban.

Right now we have been able to do that the last couple of years if we had wanted to, maybe in the last 5, maybe in the last 8 we could have.

At the risk of sounding too *mea culpa*, I probably have as many speeches at Geneva talking about the necessity for on-site inspection and the comprehensive test ban as any former official or present official. When I started making them in 1964 I think they were true but somewhere between 1964 and now—and whether or not that happened by 1969 when I was still sanguine or not—I believe history would judge isn't true now.

I am perfectly prepared to admit that. I think it was true in 1964. Certainly as a matter of political reality.

I don't think in 1964 we could have gotten a comprehensive test ban without on-site inspection through the Senate. I think we could today.

I think it would be in the net interest of the U.S. national security. It is not that I am a dreamy-eyed peacenik. I think it would be in the total best interests of the U.S. security for us to do it. We would be better off. We would be safer.

ADEQUACY OF IAEA SAFEGUARDS

Senator SYMINGTON. Finally, do you believe the IAEA safeguards are adequate?

Mr. FISHER. I would say probably they could stand improvement, but they are the best we got.

Since they are in being, I think we ought to accept them and work to improve them.

I remember once in a rather facetious observation when we were considering one of these proposed general and complete disarmament treaties we had a nonexistent but a body of—well, I've forgotten its letters, but it was for general and complete disarmament. We were debating whether certain things should be under the IAEA or under the overall control administration. One of my colleagues said, "Isn't the IAEA generally inexperienced?" I said, "Yes, but that beats the overall control organization which doesn't even exist."

So we got it.

It suffers probably the problems of—and forgive me for talking about a service with which you are more familiar than I—the Air Force in World War II had the Flying Cadets that all got to be colonels while those coming in in 1942 all made captain. But it's still better to have an organization in being to feed into. It can be improved upon, Senator, and it will be. But it's there. I think rather than to say it is no good we ought to continue to build it up.

Senator SYMINGTON. Thank you, Dean Fisher.

Senator JAVITS?

Senator JAVITS. Thank you, Mr. Chairman.

FORUM FOR CONVEYING RENAL HORROR OF NUCLEAR EXCHANGE

One thing interests me beyond everything else, Dean Fisher, and I would certainly not duplicate the very excellent questions asked by our chairman, but we have been singularly unsuccessful in bringing home to the people of our country how much they have at stake in this matter. How really destructive the atomic weapon is. It is truly Armageddon where the present state of the art is and with the only exchange an exchange of uparalleled destruction, as unthinkable as that is, you and I know it is something that could happen.

Would you have any recommendations or suggestions to us aside from all those we have been going through for all these years for conveying to the public the awesome nature of what we are dealing with, and therefore, the urgent need for unusual concentration of attention upon it?

Mr. FISHER. Well, Senator, my own specific feelings I have not really thought about in terms of the media or the forum for that. But I would think perhaps a fairly detailed discussion either by this committee or on the floor or a specific and hard-boiled proposal—that is, the nonuse proposal—might well be the forum under which the notion that the real horror of the nuclear exchange can be brought to bear.

I recall one of the things prepared by Secretary McNamara dealing with the nuclear exchange. You know, you had in one case 100 million killed and then 80 million killed in another case, and these

were direct explosion deaths. These were not radioactivity-related deaths or deaths due to breakup of civilization.

I always remember the chilling footnote that said:

In assuming casualties of this magnitude differences in deaths of 10 million more or less could occur outside of the estimate.

Whoops. Another 10 million dead—sorry but we can't figure it that close. This is really chilling.

But how do you get that across? Perhaps a discussion of "are we prepared if we want to tell other people not to develop nuclear weapons that we will promise not to use them against them?"

That does seem to me, if I were a nonnuclear power, to suggest the comment, "Look, what do you mean saying that you want us to sign the treaty, but you are not prepared to have any form of non-use agreement?"

Now the limited agreement that I indicated, that I think is based on our own ratification of the Treaty of Tlatelolco—Mexico City, that would strike me as the least we could be expected to do. But if I were a nonnuclear weapons power, I would certainly insist on that. I would really be quite vigorous in saying "How do you expect me to agree to be nonnuclear, especially in a Third World structure, if you won't agree not to bomb me?"

That is a question, it seems to me, that even an accomplished flannelmouth like myself would have trouble evading. And I have been some years in practicing evading questions like that. But I would hate to try to evade that one.

FEASIBLE INTERMEDIATE STEPS IN CONTEXT OF COMPREHENSIVE TEST BAN

Senator JAVITS. The other question I have in mind is where you speak of a comprehensive test ban; are there any steps between now and then which remain feasible?

In other words, would you feel that that is the only thing that is left to do or is there any intermediate step that might be taken?

Mr. FISHER. The only steps I could see would be within the context of a comprehensive test ban and how you dealt with the problem of peaceful explosions. There are all sorts of variances on that. Some say get rid of them entirely; some say internationalize them under some certain structures.

I see variances of that sort.

Coming up with a lower threshold I don't think would be productive at this time from the point of view of the review conference. I think you could always repeat the experience that has been tried by two Presidents, President Eisenhower and President Kennedy, what they did in announcing that we would propose a moratorium so long as the other side does the same thing.

That could be done.

There were arguments about the experience under President Eisenhower's moratorium. On the whole I think it was better than the opposite. And the moratorium that President Kennedy proposed was limited to atmospheric tests and it produced a test ban quite speedily and you didn't have any problems under it. That would be Executive action, of course, but the Senate could recommend it.

SHARING BENEFITS OF NUCLEAR ENERGY'S PEACEFUL USES

Senator JAVITS. You mentioned the fact that the nuclear powers have undertaken to negotiate nuclear arms limitations agreements, et cetera, as a condition of the nuclear Non-Proliferation Treaty.

Isn't it a fact they also undertook to share other benefits with the powers signing the treaty, that is, benefits in terms of the peaceful uses of nuclear energy, and so on?

Mr. FISHER. Yes.

Senator JAVITS. Do you think that that has been adequately dealt with?

Mr. FISHER. It is hard for me to say. I think probably so with respect to the nonexplosive side which is the unqualified section. We have added difficulties in that it is easier to get this assistance if you are not a treaty party than it is if you are because of our policies that I supported at the time and justified in exchanges with you back in 1969.

I think we should get off of that now.

With respect to the obligation to supply peaceful nuclear explosions, that obligation is more qualified. It is an if, as, and when obligation. It has all the dangers of any if, as, and when. The "if" becomes a "maybe" and the "maybe" becomes "yes."

I think our problem is not educating our colleagues that the "if" is not a "maybe" and since it has not been there it is more rather turned around to a "no" rather than a "yes." I think our failure there is in the failure of education or communication.

Senator JAVITS. So that would be your recommendation with respect to those matters which do not relate to our effort to negotiate with each other?

Mr. FISHER. Yes.

Senator JAVITS. OK.

DELAY OF HEARINGS

Professor Fisher, let me tell you that I felt personally responsible for the delay in hearing you because of our meeting yesterday. I had requested the afternoon session without knowing personally—though my office did know I didn't know—of other matters. I am sorry if it caused you any problems.

Mr. FISHER. No inconvenience at all. I am both privileged and honored to be here.

Senator JAVITS. Thank you, sir. Thank you, Mr. Chairman.

SAFEGUARDING PEACEFUL NUCLEAR TECHNOLOGY AGAINST NUCLEAR WEAPONS-MAKING

Senator SYMINGTON. Thank you, Senator.

I have one more question and that is, in view of the fact that a growing number of countries are turning to nuclear power, and that the plutonium which can be separated from reactor fuel waste can be used to make an atomic weapon, how can we prevent the distribution of nuclear technology for peaceful purposes from being used for nuclear weapons-making?

What are your thoughts on this? It is beginning to worry me more than any other single subject that we discuss in the Foreign Relations Committee, or Armed Services Committee, or Joint Atomic Energy Committee for that matter.

Mr. FISHER. Mr. Chairman, my thought on that is really to work as hard as we can to get general acceptance of the Non-Proliferation Treaty, then working to improve the IAEA safeguards and then in the context of the IAEA safeguards, increasing the recommendations by the IAEA in the field of physical security, really more material accountability rather than physical security.

Then finally, working in this same framework toward the concept of or on a regional basis basically for colocation of the whole fuel cycle facilities, including fuel fabrication, reprocessing and then trying to keep as many regional fuel reprocessing plants in existence and as few national facilities as we can.

You know, it is basically a situation of where you just don't take it out of the reactor and make it into a bomb. You have to do a lot of things with it. While it is not terribly complicated chemically as I understand it, but because everything is highly radioactive and, therefore, has to be done by remote control it becomes quite a complex operation. We want to keep as many regional fuel reprocessing plants in existence as possible and as few national facilities as we can.

With the permission of the committee I would like to submit just three pages of a recommendation on the problem of colocation and complete concentration of the fuel cycle that makes cheating harder.

Now, you can't make it impossible and I am sure even in worst-case operations even under the Non-Proliferation Treaty, the worst-case analysis could be taken to the point where you can say the treaty is worthless because they can still make bombs within the concept of the treaty.

The only answer to that is that you don't give nuclear assistance to anybody. The answer to that is you won't have a treaty at all if you don't do that. You have the same problem then of balancing the risks in this area.

My way to balance the risk is not to say, "We can't assist you in the nuclear energy area;" but to make reasonable economical suggestions on the fuel fabrication, the total fuel cycle that reduces this risk to a minimum and if I would be able to, I would like to submit a paper on this.

Senator SYMINGTON. Without objection, yes, and thank you.
[The information referred to follows:]

[From NPT: Paradoxes and Problems, Arms Control Association, Carnegie Endowment for International Peace, Washington, D.C., 1975]

During the Conference at Divonne, and concurrent with the discussions, the Conference Secretariat prepared a draft report for the convenience of the participants. The following draft section was not included in the final report because the Conference was unable to devote sufficient time to the subject. It is included here because of the interest it generated, as evidenced by the comment in Recommendation 4 of the Report that "States relying on nuclear fuel for power resources have been dependent for years on others . . . for the fuel essential to the operational of their power plants. Articles III and IV of the NPT, read wisely together, can provide a framework (through the establishment of a system of international participation in critical elements in the fuel cycle) on which national security,

safety to people and their environment, and economic independence from fossil fuels can be built." Ed.

Critical elements of the fuel cycle supporting nuclear power programs should, insofar as possible, be co-located in order to minimize the risks of diversion or theft, reduce the costs of nuclear power, improve safety, and assure the availability of source materials and advanced technology to NPT parties. This can be most effectively achieved through international cooperation.

The uranium fuel cycle is the key to both energy and weapons. Critical elements of that cycle—U-235 separation plants, fuel fabrication facilities, chemical separation plants for processing spent fuel, and storage facilities—should be co-located. In this way, physical security can be greatly enhanced, transportation risks restricted to moving the fuel to the power plant, and the application of safeguards significantly facilitated. Potential weapons materials would thus be outside international supervision only at nuclear power reactor sites, where diversion or theft is extremely difficult so long as IAEA safeguards and reasonable security procedures are in effect.

Large commercial fuel fabrication facilities and chemical reprocessing plants are at present concentrated in a few countries. The fuel itself—principally slightly enriched uranium—is still a virtual monopoly of the U.S., the Soviet Union, and to a lesser extent the UK and France. Small, or less developed countries will not be able to afford the necessary facilities on their own, but can (and for reasons of international economic health, should) share in them according to their needs.

Multi-national participation in large-scale development of nuclear fuel cycle facilities, accompanied by appropriate IAEA supervision or control, should be investigated and encouraged. Enrichment plants, along with fuel reprocessing and fabrication facilities, might be jointly owned by consortia including importing and exporting countries. Enormous political and economic benefits, along with an equal reduction in the risk of nuclear weapon proliferation, can result from such arrangements.

Ideally, the facilities involved would be co-located on "fuel cycle farms" in carefully selected and logical regions of the world in order to minimize the effects of accidents, natural disasters, seizures, and the like, and to afford convenient proximity to power stations. In this way the following needs for a world nuclear energy-based economy can be met:

(1) The need for an assured supply of fuel, for freedom from cost fluctuations engendered by commercial competition, and for freedom from political manipulation of the fuel supply. As to the latter, the gap between governmental rhetoric urging multilateral cooperation to deal with the world energy situation and government actions in concluding special bilateral nuclear deals is apparent. Nuclear resources should not be used as political bargaining chips in the oil-rich Middle East or elsewhere. The picture of a cartel restricting a nation's essential supplies of nuclear fuel is disquieting.

(2) The economics of nuclear power clearly demonstrate the advantage of large, centralized facilities. The capital investment in uranium enrichment plants for nuclear fuel is too large to be practical for most individual nations. Similar considerations apply to chemical fuel reprocessing plants, and to a lesser extent, fuel fabrication installations. Transportation and physical security are additional cost items which large co-located facilities can lower significantly.

(3) Large multinational installations can make technical assistance more effective in providing the benefits of nuclear energy to smaller and less-developed countries. The most advanced technology can and should be made available to such centers without any classification barriers.

(4) "Fuel cycle farms" will cut down transport dangers. The plutonium from nuclear reactors is dangerous and complicated to handle. Even if the Soviet Union and China are left out of account, the rate of plutonium production is expected to reach 100,000 kilograms per year by 1985. Co-location of fuel cycle facilities could virtually eliminate the transportation links that are most vulnerable to accident or theft. It is estimated that a million megawatts of nuclear power generation will necessitate seven to 12 thousand shipments of spent fuels between reactors and reprocessing plants annually. Security problems are even more severe in the shipment of the highly enriched, weapons-grade U-235 needed to fuel advanced design reactors such as the HTGR (high temperature gas-cooled reactor). Great care must be taken that large amounts of such material, as well as the plutonium created or used in power plants do not fall into the hands of criminal or terrorist groups or be allowed to poison the environment. The im-

minent entry of the "plutonium recycle" (a process which will allow the use of plutonium as fuel) into the overall process makes co-location even more important.

Senator SYMINGTON. Thank you so much, sir.

Mr. FISHER. Thank you, sir.

Senator SYMINGTON. Our next witnesses are Dr. Ted Taylor, and Prof. Mason Willrich.

Do you have a statement, Dr. Taylor?

STATEMENT OF DR. THEODORE B. TAYLOR, INTERNATIONAL RESEARCH AND TECHNOLOGY CORP., WASHINGTON, D.C.

Dr. TAYLOR. Yes. What I would like to do is submit a prepared statement to the subcommittee and make a rather brief set of observations that are complimentary to the statement, but that are not really a summary of my statement.

Senator SYMINGTON. You may proceed as you see fit.

Dr. TAYLOR. Thank you very much.

I am very grateful for this opportunity to present my views and, hopefully, assist somewhat in supplying information about what I consider to be the most important problem facing the world.

What I would like to do is very quickly get to the substance of some possible proposals for discussion at the May NPT (Non-Proliferation Treaty) Conference Review.

Before I do that, however, I would like to make a couple of judgmental statements.

ESTABLISHMENT AND IMPLEMENTATION OF SAFEGUARDS SYSTEMS

First of all, I find I am increasingly optimistic about the technical and economic practicalities of establishing worldwide, very effective safeguards that would have a very good chance of detecting any national actions in the context of NPT, or making it extremely difficult for nonnational organizations to get their hands on enough plutonium or other special nuclear materials to do large scale damage.

But I also have to say that I am much less optimistic about our overcoming the institutional and political barriers in the way of implementing these essentially physical systems. That pessimism comes from several sources. First of all, I find that every time I go through the list of the roughly 35 countries that today have within their borders either enough material to make at least one fission bomb, or enough to be able to make material for a fission bomb in 1 year or 2 when I look at that list of countries and when I look a little further at the 50-odd countries that have announced plans for large-scale use of nuclear power within the next 10 years, I get discouraged.

I see representations in those lists of just about any category of nation one wishes to use—rich, poor, large, small, nuclear, nonnuclear, history of stable government, unstable government, and so on.

Nevertheless, I see no alternative to doing the best we can to move toward these systems of safeguards to prevent further horizontal spread geographically of nuclear weapons and to prevent the spread to nonnational groups.

I think we have no other choice.

I might say that we are going to have this job to do no matter what happens in terms of moratoria on nuclear powerplant construction in

the United States, or even worldwide. We are going to have to solve this problem one way or another in any event.

FURTHER NUCLEAR PROLIFERATION

I am also not optimistic that the number of countries that will have announced nuclear explosive capabilities will remain at six. In fact, I guess I have concluded that since it is possible for any country of just about any scale that has sufficient nuclear materials within its borders to make militarily-effective nuclear explosives, if they want to, I think further proliferation will happen.

I think we are going to see some amount of horizontal proliferation, that is, new countries and possibly nonnational organizations, acquiring nuclear explosives. I am also afraid, based on what has been going on for many years, and even recently, that we will also see more vertical proliferation in terms of more nuclear warheads in the countries that now have them.

Nevertheless, there are actions—and I want to get to these rather quickly—that I think will have significant effect in making the levels of risk less than they would be if we kind of ducked under the wave and hoped the whole problem would go away.

NPT REVIEW CONFERENCE IDEAL FORUM

Now, I believe that the NPT Review Conference is an ideal forum for airing a number of possibilities for helping to bring this problem under control, in spite of the fact that some of the most important players will probably not be in the conference.

I do not believe that—at least in connection with the kinds of proposals I would like to mention briefly in a moment—that we, or anybody else in the world as far as I know, have done enough of our homework to be able to say categorically that these are good proposals, that we have assessed the pros and cons of instituting them, and that we propose their adoption. But I think we should start very serious discussions of these at the conference, and before the conference—certainly in the United States—expecting that things will not end, so far as new action on this front is concerned, at the end of the conference.

I think it is especially important that we listen very carefully to what other countries and different people in other countries are saying because, as Mason Willrich has said a number of times, governments are not of one mind, necessarily.

I think we have to listen very carefully to their views of the whole proliferation problem and make sure that what we propose to do is responsive to at least a detailed understanding of their positions. We may not agree with it, but we had better know what it is.

I frankly do not think we know what it is universally accepted in this country.

FOCUS OF DR. TAYLOR'S PROPOSALS

The focus of these proposals is on trying to answer the question, "What is to be done with the plutonium that is being made in the fuel in the power reactors in the 20-odd countries that are now making nuclear power?"

If we can get a satisfactory answer to that, I think we will have done much to answer the question of how to deal with the risks and abuse of peaceful uses of nuclear energy.

INTERNATIONAL FREEZE ON FURTHER FUEL REPROCESSING

There are several possibilities. First of all, it is important to realize that, although the irradiated reactor fuel is enormously radioactive, so much so that the person would be killed in a few minutes if he stood next to a spent fuel element. It is a relatively simple matter, on a national scale, to build a reprocessing unit—I wouldn't call it a facility—to convert that plutonium to a form that can be used to make nuclear weapons.

Senator SYMINGTON. Excuse me. I will have to vote now, and will be back as soon as I can.

Dr. TAYLOR. Yes, sir.

[A recess was taken.]

Senator JAVITS. The committee will come to order.

Senator Symington has asked me to continue the hearing.

Will you proceed?

Dr. TAYLOR. I was speaking of the state of the plutonium as it comes out of a nuclear powerplant. Some use the phrase "self-protection" in the sense that it is very heavy, radioactive, and difficult to handle without extreme danger. I think that is not a terribly strong inhibition against a country doing what is necessary to extract it, but it is a big inhibition against theft by even sophisticated nonnational organizations.

It is not only an inhibition against theft, but it is an inhibition against further processing of the material to extract the plutonium and make nuclear explosives out of it unless the organization that has this material is prepared to build a large remote-handling facility for the material.

So that one possibility to at least give the world time to be able to figure out what is best to do with this plutonium subsequently is to come to an international freeze on further reprocessing of fuel.

From a technical and economic standpoint, I think one could show that if this freeze lasted for 5 years that the economic penalty to those countries planning to use plutonium for power would be very small.

By "very small," at most a few percent, like 2 or 3 or 4 percent of the cost of making the power.

Now, there would be enormous political difficulties in arriving at agreement of this sort and enforcing it, but I should say that one reason I am attracted to this idea is that it seems to me that it is in the self-interest of all countries that have these materials within their borders to make sure that it is not stolen—as opposed to being diverted by them—completely outside of the context of the Non-Proliferation Treaty. Every country in the world, I believe, will feel threatened if they understand the nature of threats that include the possibility that the plutonium, once extracted from this self-protected form in which it comes out of the reactors, might come back at them in the form of terrorist explosives, duress, or extortions, or whatever.

In fact, my main basis for hope that there will be rather quickly established an international system of safeguards that is really ef-

fective, is based on this observation that it is just as much in the interests of the French, the Indians, the British, the Russians, and the United States to see to it that theft of these materials is very difficult to accomplish.

I think that one of the political difficulties with proposing such an international convention, if you will, is tied up in the fact that in the United States we are not now reprocessing any fuel. We have no reprocessing plants in operation.

That is not the case in Western Europe. The British and the French have large reprocessing plants now operating, and I believe this is also true of smaller plants in Italy.

So this might be viewed by some of the Western European powers as an attempt by the United States to allow the United States to catch up in the extraction and subsequent recycling of plutonium.

I think the way to deal with that problem is through very straight, honest, detailed discussions with appropriate people in these countries to make it clear just why we are making that proposal and why it is in their interests just as much as in ours to keep the plutonium for a while in the form where it is very difficult to steal.

COLOCATION OF SENSITIVE PARTS OF NUCLEAR FUEL CYCLES

A second possibility which does not exclude the first, necessarily, is this idea of colocation of the particularly sensitive parts of the nuclear fuel cycles. The proposal that Dean Fisher referred to is this one.

It seems to me that one has to go beyond the idea of colocation of fuel reprocessing and fuel fabrication and also fuel enrichment, uranium enrichment plants. It is a matter of colocation and operation in some multinational or even international way, so that there is a working situation such as to make it unlikely that any country could sufficiently control such a center so that it could divert large quantities of plutonium to weaponsmaking purposes.

There is also the matter of sites, and where they should be. It is easy to say one should choose neutral countries and site these centers in neutral countries.

The question comes up, "What is a neutral country, and how long will a country now considered neutral be considered neutral in the future?" We are talking, of course, of a lifetime for these facilities of 30 to 40 years.

I would like to go one step further in this proposal for further study and that is to go back, you might say, halfway toward the Baruch proposal made many years ago, and that is to ask, "Would it make sense for the International Atomic Energy Agency to operate and have the responsibility for maintaining their operations in such collocated facilities?"

One could start by thinking of such a facility being built up perhaps in Austria. Austria has the advantage that the IAEA headquarters were put there to begin with.

I see more difficult political areas, such as South America. Where would one put these in South America and say that it is in a stable country?

I think these are questions that we are trying to answer and it is this type of discussion that I would start out the review conference with.

REMOVING HIGH CONCENTRATIONS OF PLUTONIUM FROM FUEL CYCLE

A third suggestion is rather technical. It was proposed, as far as I know, only rather recently by Karl Priechl, who is an independent nuclear consultant who has many years of experience in fuel fabrication. His proposal is that plutonium, when it is extracted from used fuel at a reprocessing plant, be immediately mixed with all the uranium that would ultimately be used in making new fuel, rather than, as is the current plan, to extract the plutonium as essentially pure plutonium nitrate, converting it to plutonium oxide, and later mixing it with only part of the uranium for fresh fuel.

What his proposal would accomplish would be to remove from any points in the fuel cycle high concentrations of plutonium.

He estimates that with the kinds of nuclear powerplants that are now being built and operated in most of the world that the ratio of plutonium to uranium in this fuel, if it is distributed uniformly, would be about 1 in 200.

Now, this accomplishes right off something very straightforward and simple; that is, it forces anyone who is trying to divert or openly steal material, to pick up about 200 times as much weight for the same amount of plutonium as they would otherwise.

This proposal is rather startling in that it looks as though this might actually be more economical than proceeding the way we were planning to use concentrated plutonium, trying to force the plutonium into as few fuel elements as possible.

I think this is a very serious proposal, and one of the kinds of rather technical ideas—though technical in a straightforward way—that would ease the burden of providing safeguards for these materials.

Those are three suggestions that I offer for consideration for possible placement on the agenda of things to be discussed in Geneva in May.

WORLD CONCERN ABOUT NUCLEAR TERRORISM

Now, I want to close with just one point, and that is that the foundation of my own sense of hope that this problem of protecting material from theft, at least, if not from national proliferation, can be controlled is that it is so obviously in the best interests of every country in the world to see to it that these materials are protected from theft. I do not care if it is France, India, Russia, or the United States, or Cambodia, or whoever. There is some message that this is coming through.

The Indian Ambassador to the United Nations at the Conference that Senator Symington and Mason Willrich were at in New York, N.Y., a month and a half ago told me that as a result of public attention given to this concern about nuclear terrorism, it has caused the Indian Government to improve substantially the physical security given to their plutonium.

Now, I do not know what they have actually done, but he said this quite seriously.

Another example is that my company had an inquiry about 6 weeks ago from the Iranian Government. The question was whether we would be willing to help them make physical security plans for protecting their plutonium—remember, Iran is a ratifier of the Non-Pro-

liferation Treaty. Their concern is not to hire us to help them cheat. That is quite clear. It was to get us to help them, presumably, along with other people to set up a really effective physical security system in Iran.

Another example is the French Government. We have had a lot of discussions with people in the French Government and French industry about this problem. There is an intense interest in France now in this matter of giving much better physical support to the materials.

That action, that concern, I find more hopeful than just about anything that has happened along the proliferation front in the last several years.

I think we can build on it. There are connections, some of them subtle, some of them pretty straightforward, between that reason for safeguards and the reason having to do with horizontal national proliferation.

If you have good physical security safeguards, there is a sort of a technical fallout that will affect the effectiveness of bona fide attempts to abide by the Non-Proliferation Treaty.

That concludes my remarks, and I thank you.

[Dr. Taylor's prepared statement follows:]

PREPARED STATEMENT OF THEODORE B. TAYLOR, CHAIRMAN OF THE BOARD, INTERNATIONAL RESEARCH AND TECHNOLOGY CORPORATION

Mr. Chairman and Members of the Subcommittee: My prepared statement for these hearings is a brief overview of the risks of theft or diversion of nuclear materials from components of non-military nuclear technology and present and possible future safeguards designed to reduce those risks. Various technical and nontechnical aspects of this subject are covered in much greater detail in a number of recent publications.¹⁻⁷

The information and non-nuclear materials needed to make fission explosives are now widely distributed and available to the general public. Dozens of nations have or could acquire the skills and facilities required to design and build reliable, lightweight, and efficient fission explosives. Crude, inefficient, and statistically variable yield, but nonetheless highly destructive fission explosives that could be transported by automobile could be designed and built by small groups of people, conceivably by individuals working alone, if they somehow managed to acquire the needed quantities of special nuclear materials. Under some conditions this could be done in an ordinary home workshop, using equipment and materials that are commercially easily available worldwide.

Plutonium, highly enriched uranium, or U²³³ of the isotopic compositions used or produced in all types of power reactors could be used as core materials for fission explosives. Metallic, oxide, and some other chemical forms of these could all be used. The required amounts and the resulting explosion efficiencies, however, would depend on the chemical forms, as well as the specific type of explosive assembly system used.

The presence of Pu²⁴⁰ and Pu²⁴², and the associated neutrons released by their spontaneous fission does not preclude the use of reactor grade plutonium in fission explosives. Under some conditions the minimum yield of such explosives might

¹ Leachman, R. B., Althoff, P., ed., *Preventing Nuclear Theft: Guidelines for Industry and Government*. New York: Praeger, 1972.

² Willrich, M., ed., *International Safeguards and Nuclear Industry*. Baltimore, Md.: Johns Hopkins University Press, 1973.

³ Comptroller General of the United States, *Improvements Needed in the Program for the Protection of Special Nuclear Materials*. Report to the Congress by the General Accounting Office, Washington, 1974, and *Protecting Special Nuclear Material in Transit: Improvements Made and Existing Problems (B-184105)*, GAO, 1974.

⁴ McPhee, J., *The Curve of Binding Energy*. New York: Farrar, Straus, and Giroux, 1974.

⁵ Willrich, M., Taylor, T. B., *Nuclear Theft: Risks and Safeguards*. Cambridge, Mass.: Ballinger, 1974.

⁶ Rosenbaum, D. M., et al., *Special Safeguards Study*. Prepared for the AEC's Director of Licensing in the spring of 1974.

⁷ U.S. Atomic Energy Commission, Tech. Rep. WASH-1535 *Proposed Final Environmental Statement, Liquid Metal Fast Breeder Reactor Program*, 1974.

be comparatively low, of the order of the equivalent of 100 tons of high explosive, and the actual yield of a specific device could only be predicted to be within a rather wide range; i.e., a probability distribution of yield, rather than a specific yield, is all that could be predicted.

It is well known that implosion-type fission explosives achieve supercriticality by compressing the special nuclear material core. Thus fission explosives can be made with amounts of special nuclear material that are initially subcritical at normal densities. The normal density critical masses of metallic spheres of uranium enriched to 93% in U^{235} , plutonium containing a volume fraction of 30% of Pu^{240} plus Pu^{242} , and 95% of U^{235} , each in a thick natural uranium reflector, are, respectively, about 17 kilograms, 8 kilograms, and 6 kilograms. In the form of oxides at crystal density, the corresponding critical masses are 20% to 30% greater.

Plutonium, if dispersed in micron-size or smaller particles suspended in air, could also be used as a means for causing large numbers of human casualties and considerable property damage in a densely populated area. As little as a few grams of plutonium more or less uniformly distributed in the air inside an office or residential building area of several thousand square feet for fifteen minutes could deliver an inhalation dose to the occupants that would be likely to cause death from cancer some years later. Dispersal of somewhat larger quantities of plutonium in outside air could cause the evacuation from and decontamination of significant fractions of a large metropolitan area, the actually affected areas depending on weather conditions, the characteristics of buildings in the area, and a number of other factors.

Thus the presence of special nuclear materials within components of the world's nuclear energy systems carries with it the risks of their diversion by nations from peaceful to military purposes, or of their theft by criminals for extortionist, terrorist, or other criminal purposes. The extent of these risks depends not only on the motives of national governments and non-national groups of people, but also on the numbers of geographical distribution of places where these materials exist, the quantities of special nuclear materials at such places, and the types of safeguards against national diversion or criminal theft to which the materials are subjected.

The total amount of plutonium that has already been produced in the world's nuclear power plants (excluding the reactors in the United States, the Soviet Union, and the Peoples' Republic of China that have been used only for production of nuclear materials for weapons) is roughly 60,000 kilograms, a majority of which is still contained in irradiated reactor fuel assemblies that have not been reprocessed. Of this, about 12,000 kilograms are accounted for in 15 countries that have operating power reactors, but that have not publicly announced nuclear weapons systems: Argentina, Belgium, Bulgaria, Canada, Czechoslovakia, Western Germany, Eastern Germany, India, Japan, the Netherlands, Pakistan, Spain, Sweden, and Switzerland.⁸ In addition, the following 30 countries have announced intentions to acquire large nuclear power plants within the next ten years: Australia, Austria, Bangladesh (perhaps recently canceled), Brazil, Chile, Egypt, Finland, Greece, Hong Kong, Hungary, Iran, Ireland, Israel, Jamaica, South Korea, Luxembourg, Mexico, New Zealand, Norway, Pakistan, the Philippines, Poland, Portugal, Romania, Singapore, South Africa, Taiwan, Thailand, Turkey, and Yugoslavia.⁹ This brings to at least 50 the total number of countries that can be expected to have sufficient quantities of plutonium for at least dozens of fission explosives by 1985. By 1980 the world's total rate of production of plutonium in power reactors in about 30 countries is expected to be more than 40,000 kilograms per year, and the cumulative total produced by then will be more than 200,000 kilograms.

At least ten countries—the United States, the Soviet Union, the United Kingdom, France, the Peoples' Republic of China, Belgium, Western Germany, Italy, Japan, and India—have or are constructing nuclear fuel reprocessing plants capable of separating several hundred kilograms or more of plutonium per year. No commercial reprocessing plant has been in operation in the United States since early 1972, and none will be until mid 1976, at the earliest. In Western Europe, on the other hand, substantial reprocessing facilities now exist in several countries.

⁸ U.S. Atomic Energy Commission, *Nuclear Growth, 1974-2000*, WASH-1139, 1974.

⁹ *Ibid.*

The International Atomic Energy Agency (IAEA) in Vienna has the responsibility for safeguards to detect diversion of nuclear materials from peaceful purposes to destructive purposes by nations that are parties to the Treaty on Non-Proliferation of Nuclear Weapons (NPT) or that have otherwise agreed to place their civilian nuclear materials under international safeguards. It is not responsible, however, for applying physical security safeguards to prevent overt theft or clandestine diversion by non-national groups, such as terrorists or other criminals. This is left to individual countries to take care of.

Although the IAEA has served an international safeguarding function for more than 15 years, its present safeguards system requires additional strengthening to assure that national diversion of significant quantities of nuclear weapons materials will be promptly detected. The present IAEA annual budget for this purpose is roughly \$5 million. Somewhere around 50 IAEA inspectors have the job of performing audits of nuclear material balances and periodically inspecting nuclear facilities in several dozen countries, a huge task for such a small group.

Present U.S. physical security applied to special nuclear materials for civilian purposes, though strengthened substantially during the last two years, is still inadequate to prevent theft by determined groups having resources and skills similar to those that have been used for successful bank robberies or hijacking of valuable shipments in the past.¹⁰ Serious consideration is now being given by the Nuclear Regulatory Commission to possible new regulatory actions designed to protect special nuclear materials in the United States against overt theft or clandestine diversion considerably more effectively than is implied by current regulations and regulatory guides. There are also indications that other countries are planning to do the same. The remainder of my statement is concerned with possible new safeguards measures that might be adopted in the United States and other countries to provide much better physical security for special nuclear materials than at present.

A guiding principle, called the "principle of containment" has been proposed for the design and assessment of security systems for the protection of special nuclear materials.¹¹ According to this principle, all materials that could be used to make fission explosives and that are used, products, or processed in the nuclear power industry would be contained in areas circumscribed by a well defined set of barriers. These barriers would exclude unauthorized persons. A minimum number of authorized channels for the flow of such materials through the barriers would be established. All other channels would be continuously monitored, by means of the best available technology, to detect any unauthorized flow of materials. In addition to the physical barriers, and other deterrents to theft, a network of alarms, communications, and security forces would be set up in such a way that no credible attempt to remove nuclear materials from authorized channels, whether by employees, outsiders, or a combination, would be successful.

Some of the specific security measures that might effectively be used in applying this principle and that are under study are the following:

Co-location of fuel reprocessing and fuel fabrication plants at the same site, to remove the particularly vulnerable transportation link for recycled plutonium in concentrated form. This is not current practice.

Dilution of separated plutonium by slightly enriched or natural uranium at the output stages of reprocessing plants, to produce the mixed oxide fuel materials before transfer to a fuel fabrication plant.¹² In equilibrium, the concentration of plutonium mixed oxide fuel would be about 0.6% if all refabricated fuel for a light water reactor power system consisted of mixed oxides. This would not only lead to a requirement for chemical separation of the plutonium from stolen fuel material before it could be used for making fission explosives, but also, and perhaps more importantly, increase by more than a factor of 100 the total weight of fuel material that would have to be stolen to provide a given weight of contained plutonium.

"Spiking" of plutonium or, where applicable, highly enriched uranium or ^{235}U with intensive gamma ray emitters in sufficient quantities to require massive shielding to prevent lethal doses of gamma radiation from being delivered, in an hour or less, to people handling kilogram quantities of these special nuclear materials. The "spiking" materials could be retained fission products with relatively low thermal neutron cross sections, or added isotopes, such as Co^{60} . "Spiking" at such high levels (in the range of hundreds of REM's per hour per kilo-

¹⁰ See references 1-7.

¹¹ See reference 5.

¹² Private communication: Puechl, Karl, 1975.

gram of plutonium at one meter, for example) would require use of massive shielding at all subsequent steps in a fuel cycle, to keep radiation exposures to workers at acceptable levels. Although some preliminary studies of this possibility are underway, it is not yet clear whether it will be cost effective.

"Spiking" of special nuclear materials with gamma ray or neutron emitters in order to make them easier to detect with passive monitoring equipment. Routine use of this technique could lower the threshold for detection of unshielded special nuclear materials at doorway monitors, for example, to less than one gram, without requiring anywhere near as much shielding to keep worker exposures at acceptable limits as if "spiking" were used to make the materials "self-protecting."

Use of specially designed motor vehicles and shipment vans designed to protect shipments of special nuclear materials from rather massive and sophisticated attempts to penetrate the van or commandeer the vehicle for sufficiently long times to allow large law enforcement, or even military forces to arrive at the scene of an attempted hijacking before it can be completed.

As an alternative to the above measure, the use of rail transport of all special nuclear materials inside shipping containers similar to the roughly 100 ton containers contemplated for use in shipping irradiated fuel from reactors to reprocessing plants.

The establishment of a Federal protective service for the explicit purpose of safeguarding nuclear materials in transit and also at fixed sites. This possibility is currently being assessed by the Nuclear Regulatory Commission.

A common reaction to these and other proposed major new safeguards measures is that, taken together, their costs are likely to make nuclear power economically uncompetitive with alternative sources of energy. Preliminary studies of the capital and operating costs of considerable more effective safeguards than those called for by present regulations, however, strongly suggest that this is not the case. One such set of estimates, for example, leads to the conclusion that the operating costs of a rather massive security system applied to light water reactor fuel cycles, with routine recycle of plutonium, would correspond to less than 1% of the cost of nuclear electric power produced by the system.¹³ The total number of physical security personnel employed for the safeguarding of an 80,000 MW(e) light water reactor fuel cycle, with 20 separately sited power plants, was taken to be about 800, of whom approximately 150 would be on duty at any particular time.

Thus, from technical and economic standpoints, it appears to be possible to design physical security systems that would require skills and resources greater than those used for major thefts of valuables in the past for successful theft of potentially dangerous quantities of special nuclear materials. Whether or not the institutional and political obstacles confronting efforts to implement such effective safeguards against theft, and also against national diversion of special nuclear materials, can be overcome within the next few years, however, remains to be seen.

Senator SYMINGTON. Thank you.

Senator JAVITS, would you like to ask any questions?

Senator JAVITS. No; not at all. I think I have gotten the points down exactly, and I would not be presumptuous enough to question one who is so technically skilled.

Senator SYMINGTON. Dr. Willrich, we welcome you, sir. I was very impressed with the presentation you made in New York, and I wish you would be frank with us and tell us what is on your mind.

STATEMENT OF DR. MASON WILLRICH, UNIVERSITY OF VIRGINIA LAW SCHOOL, CHARLOTTESVILLE, VA.

Dr. WILLRICH. I have a prepared statement which I presume will be printed in the record.

Senator SYMINGTON. Without objection, that will be entered in the record.

¹³ See reference 7.

Dr. WILLRICH. In view of the lateness of the hour, I would just simply say a few things which come at the end of my statement, and then add to that, some specific suggestions that are a bit more focused.

Senator SYMINGTON. Before you go ahead, there is no hour that is as important as getting this type of testimony from you.

Dr. WILLRICH. Thank you, sir.

U.S. POLICY CONCERNING WORLDWIDE NUCLEAR POWER DEVELOPMENT AND USE

It should be readily apparent that a governmental policy decision to refrain from acquiring nuclear weapons and to accept the application of IAEA safeguards on civilian nuclear activities is reversible. A nuclear power posture is not.

Secretary Kissinger has stated that international nuclear transactions "can no longer be treated by anyone as a purely commercial competitive enterprise." Such transactions have never been treated this way. They have often been subsidized heavily by exporters and they have always been viewed politically by both exporters and importers.

Safeguards against diversion should not be bargained away in politically motivated competition. However, the central aim of U.S. foreign policy should be to encourage the worldwide development and use of nuclear power on a sound economic basis. Regardless of the conduct of other countries, the U.S. Government should avoid the use of nuclear power reactors as political bargaining chips in the Middle East or elsewhere in the world. Moreover, the United States should reconsider the advisability of continued subsidies for export sales of nuclear materials or equipment.

COMPLIMENTARY ECONOMIC AND SECURITY INTERESTS

If nuclear power were developed in the future with economic considerations primarily in view, only the largest national nuclear power programs would be self-sufficient. The remainder would be strongly interdependent because of the economies of scale in nuclear fuel cycle operations.

There is a strong economic argument against the construction of nuclear fuel cycle facilities—enrichment, fuel fabrication or chemical reprocessing—in any country until it has a large nuclear power capacity. There is also a solid commercial basis for the colocation of nuclear fuel cycle facilities and their construction and operation under multinational forms of ownership. In the development of a worldwide nuclear power industry, therefore, economic and security interests appear complementary rather than conflicting.

ENCOURAGING THE DEVELOPMENT OF NUCLEAR POWER INTERDEPENDENCE

The United States could encourage the development of nuclear power interdependence in two important ways.

First, the United States could offer to provide its most advanced uranium enrichment technology for large enrichment facilities that would be built outside the United States under multinational ownership and IAEA safeguards. Such an offer was extended in 1971 and again as part of the international energy program growing out of the

Washington Energy Conference in 1974. I believe it must be pursued with urgency as part of a broader effort to encourage the multinational ownership and operation of chemical reprocessing, fuel fabrication, and associated nuclear material storage facilities.

Second, in addition to the requirements for IAEA safeguards under the NPT or under U.S. agreements for cooperation with countries not parties to the NPT, the United States could adopt the following nuclear export policy: The United States would require that fuel used in power reactors exported from the United States and fuel enriched in the United States for use in foreign power reactors be reprocessed either in U.S. facilities or in facilities that were multinationally owned and operated under IAEA safeguards. Moreover, plutonium recovered from irradiated fuels would be stored at such facilities pending its fabrication into completed fuel assemblies and shipped for immediate recycling.

Exports of high enriched uranium or plutonium for use of research and development programs would have to be the subject of especially negotiated conditions as to safeguards during use of that material.

As far as international safeguards against governmental diversion are concerned, article III, paragraph 2 of the Non-Proliferation Treaty would apply.

With respect to national safeguards, against nongovernmental diversion for sabotage, U.S. exports of nuclear materials and equipment would be subject to a requirement that they be protected in the recipient country and any third country to which they may be transferred by physical security measures designed to give at least the level of protection afforded similar materials and equipment in the United States.

Such policies as I have outlined would not succeed unless other countries developed a common view of nuclear power interdependence as being in their own long-run economic and security interests.

The nonnuclear weapon countries must seize the present opportunity they now have, but will not have for long, to develop nuclear power on the basis of interdependence instead of self-sufficiency.

I believe that they are the countries who will be the big losers in the proliferation scenario that we are trying to prevent from happening.

The major industrial countries of Western Europe and Japan, the resource-rich, nonindustrial countries, and the less developed countries need not be dependent upon the United States or the Soviet Union. Instead, they can develop cooperation among themselves. The United States should foster that kind of cooperation, in my judgment, Mr. Chairman.

This is the kind of interdependence that will be the most important.

CONCLUSION

In conclusion, in the nuclear era, it is clear from an economic viewpoint, and even more from a security viewpoint, that the interests of nations are becoming increasingly interwoven into an interdependent world.

Thank you, Mr. Chairman.

[Dr. Willrich's prepared statement follows:]

PREPARED STATEMENT OF MASON WILLRICH, PROFESSOR OF LAW,
UNIVERSITY OF VIRGINIA

Mr. CHAIRMAN: I am pleased to appear before you today to offer my views on the problem of nuclear weapon proliferation. First, I will consider briefly the relationship between U.S.-Soviet nuclear arms control and efforts to inhibit other countries from acquiring nuclear weapons. Next, I will discuss the impenetrable, and national safeguards against non-governmental, nuclear weapon proliferation. Thereafter, I will analyze international safeguards against governmental, and national safeguards against non-governmental, nuclear weapon proliferation. Finally, I will make some specific suggestions regarding U.S. foreign nuclear energy policy.

We live in a dangerous world with very imperfect political institutions. But I do not think that means we must accept unlimited nuclear weapon proliferation. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the International Atomic Energy Agency (IAEA) safeguards system that goes with it can provide a basis for controlling proliferation. Indeed, this is the only basis we have to work from. The countries participating in the NPT Review Conference in May 1975 would be well advised to do their best to strengthen the Treaty and its safeguards, not tear it apart or walk away from it. Of course, governments make up their own minds—and change them from time to time—about the nuclear weapon proliferation issue.

The SALT-NPT relationship

The U.S. and Soviet are locked in a nuclear arms race that has thus far proved quite uncontrollable. The two super powers continue to be the major proliferators of nuclear weapons in the world.

I do not believe, however, we should discount the significance of what was achieved in the first phase of the strategic arms limitation talks between the U.S. and U.S.S.R. (SALT I). The ABM Treaty contains stringent restrictions, and it has subsequently been made even more comprehensive by the agreement to restrict ABM deployment to one site on each side, rather than the two originally agreed. Both sides have thus accepted what, in fact, neither side had accepted before: a situation of mutual deterrence, and mutual vulnerability. But the problems remaining on the offensive side appear exceedingly difficult.

It is too early to tell whether the 1974 Vladivostok agreement on very high ceilings—2400 strategic launchers and 1320 MIRVs on each side—was a step forward or a mistake. In SALT II, therefore, I believe early agreement is necessary on substantial reductions from the Vladivostok ceilings on the basis of parity or essential equivalence.

It is important in the non-proliferation context, however, for the non-nuclear-weapon countries to recognize that the link between vertical and horizontal proliferation becomes less important as and if detente between the United States and the Soviet Union continues to evolve. Less developed countries especially have more freedom of action now than during the height of the Cold War when they were frequently pressed to choose one side or the other. Neither superpower appears to be threatening non-nuclear-weapon countries with nuclear destruction. This is in contrast to the situation when the linkage between horizontal and vertical proliferation was formulated. The strategic relationship between India and China raises a special and difficult problem. But in the overall picture, the failure of the U.S. and U.S.S.R. to completely halt their own nuclear arms race should not be viewed as a sufficient reason for a non-nuclear-weapon country to refuse to adhere to the NPT.

Nuclear power development and weapon proliferation

With the example of the two superpowers before them, and the necessity of existence in a world in which organized violence is frequently used to deal with conflicts of national interest, it is perhaps remarkable that so far in the nuclear age only four other countries have overtly acquired a nuclear explosives capability. However, the essential fissionable ingredients for explosives are only now for the first time becoming readily available in a large number of countries. In the future, how slowly or rapidly the number of governments armed with nuclear weapons increases will depend less on technical and economic considerations and more on how governments perceive their own political, security and prestige interests. In particular, the possibilities for nuclear weapon proliferation are likely to increase dramatically if nuclear power continues to develop along nationalistic lines.

Given international political realities, there are a variety of motives for national governments to establish nuclear power programs. These include: low-cost electric power; increased energy security; creation of a nuclear weapon option; and prestige.

The economic case for nuclear power has been strengthened and expanded by the fourfold increase in world oil prices in 1973-74. Nuclear power reactors in the 1,000 megawatt range, the most efficient size given economies of scale, now appear to have a competitive advantage over fossil-fueled alternatives. Thus, a compelling economic case for nuclear power can be made in industrially advanced countries with relatively large electric power grids. Moreover, nuclear power reactors in smaller, less efficient sizes appear also to be competitive with oil-fired electric power generation at current world oil prices. The high oil price thus provides an economic rationale for nuclear power in a much larger number of countries with smaller electric grids. Given the desperate financial circumstances of many countries in the wake of the oil price explosion, however, relatively few may be able to exercise the nuclear option in the near future without a substantial subsidy. This is, of course, especially true in less developed countries.

Nuclear power can offer increased security of energy supply basically in two ways. First, nuclear fuel can be substituted for oil for electric power generation, thereby diminishing a country's dependence on the world oil market that has, for the near term at least, been effectively cartelized by OPEC. Second, nuclear power can be exploited in a way that will lead to the eventual development of a maximum degree of national nuclear self-sufficiency. It is difficult to stockpile more than a few months of current requirements of oil. A handful of pellets of nuclear fuel are, however, equivalent to 85 tons of coal or 15,000 gallons of fuel oil. Because the energy contained in a given volume of nuclear fuel is so concentrated, it is physically quite possible to stockpile several years' worth of nuclear fuel in advance of need. Moreover, if successfully developed, breeder reactors, which produce more fuel than they consume as they generate electric power, would substantially reduce the amount of raw materials—uranium or thorium—required to sustain a growing nuclear power capacity. However, in most national circumstances for the foreseeable future, nuclear self-sufficiency could be achieved only if industry in the country involved were able to acquire and operate sophisticated fuel cycle technologies and if the government were willing to pay a very large economic penalty.

Nuclear power can result in a nuclear weapon option in a large number of ways. The basic requirement is the availability in the country concerned of plutonium or high-enriched uranium.

The spread of nuclear power is dramatically changing the way in which nuclear weapon proliferation in the world must be perceived. The first five nations to acquire nuclear weapons—the U.S., the U.S.S.R., Great Britain, France and China—established major military programs motivated primarily by national security and prestige considerations. The sixth nation to explode a nuclear device—India—used plutonium diverted from a reactor constructed ostensibly for "peaceful purposes." India is the first of a potentially long list of countries that may in the future acquire nuclear explosive capabilities as relatively cheap "spin offs" from their civilian nuclear activities.

It is important to understand that the pursuit of self-sufficiency in a nuclear power program leads inevitably to the creation of a nuclear weapon option, and at the same time nuclear self-sufficiency reduces external political constraints which might prevent a government from exercising that option. Thus, one nation's pursuit of nuclear energy self-sufficiency may well appear provocative to another.

Finally, a nation may believe that its prestige—domestically, internationally, or in both respects—will be enhanced if it embarks on a nuclear power program. From its inception the development and use of nuclear power has been afflicted by prestige considerations.

The issue is not whether we have nuclear power, but how we manage it. As of January 1975 over 360,000 megawatts of nuclear power capacity was operable, under construction or on order worldwide. This figure reflects most of the slippage that has occurred since the 1973-74 OPEC oil price revolution. Whereas 15 countries now have operable nuclear power reactors, 30 countries will have them in 1980.

Beyond 1980, the annual plutonium output from nuclear power programs throughout the world will increase rapidly to hundreds of thousands of kilograms and eventually reach millions of kilograms, assuming nuclear power forecasts are fulfilled. Yet five kilograms, or less, of plutonium is enough for a bomb capable of destroying a medium-sized city. Therefore, one of the most challenging energy policy issues is how to manage over the long run the inherent risks of nuclear weapon proliferation. The widespread use of nuclear power must not lead to widespread nuclear violence.

The risks are two fold: diversion of materials from nuclear power industries by governments; and theft of materials by criminals or terrorists.

IAEA safeguards

One of the primary functions of the IAEA is to ensure that governments do not divert to any military purpose the nuclear materials used, produced and processed in their civilian activities. To verify that diversion has not occurred, the IAEA has developed a materials accountancy system. Internationally administered materials accountancy cannot prevent a nation from diverting materials. Neither the IAEA itself, nor any other United Nations organ, contains a security force capable of action to prevent a national government from diversion. Moreover, the uncertainties in an accounting system applied to large nuclear material flows results in; a detection threshold which is quite high compared with the small quantities of materials that could be strategically significant; and possibly a detection time that is quite long in relation to the time it takes to fabricate nuclear explosives with diverted materials.

Finally, if a government decides to divert nuclear materials from a civilian to a military program, it is unlikely that it would structure the diversion action in such a way that the IAEA inspection process would ever yield clear-cut evidence of a violation. More likely, the government would use tactics which would delay or frustrate the operation of the IAEA inspectorate, and confuse or obfuscate the matter as it was considered by the member governments on the IAEA Board of Governors and elsewhere.

IAEA material accountancy safeguards do, however, have an important role to play in connection with efforts to prevent or slow the spread of nuclear weapons. They enable a nation with a nuclear power program to offer as much evidence as practical, without interrupting commercial operations, of the exclusively civilian nature of its activities. The nation can do so by fully subscribing to and cooperating with the IAEA safeguards system. Moreover, a nation can offer its evidence to an impartial international agency for verification to the world community, rather than having to satisfy a hostile and suspicious neighbor on a bilateral basis. In recognition of the basic duality of nuclear energy, IAEA safeguards can thus help those nations who wish to do so to develop and use nuclear power in a less ambiguous and potentially threatening way than would otherwise be possible. Of course, national governments change and their policies change, so that a nuclear power program in one country will always appear somewhat ambiguous to the governments of other countries.

National safeguards

National governments and the societies they try to govern have, over the centuries, lived with a relatively high level of criminal and terrorist activity. Even persons in positions of governmental responsibility sometimes turn out to be criminals and yesterday's feared terrorists too often become tomorrow's respected government leaders.

With the widespread use of nuclear power, governments have a grave new responsibility. They must provide their citizens with effective assurance that not even a few kilogram of the tens of thousands, hundreds of thousands, and eventually millions of kilograms of plutonium in their nuclear power industries fall into the hands of criminal or terrorist groups. Otherwise, nuclear blackmail and acts of nuclear violence could become much too commonplace. This is a challenge that all governments share jointly.

The U.S. government has recently strengthened its safeguards against nuclear theft applicable to the U.S. nuclear power industry. However, more needs to be done before the American people can be reasonably safe when large flows of nuclear explosive materials begin in the nuclear industry. Fortunately, no civilian chemical reprocessing plants are now in operation in the U.S. and large-scale recycling of separated plutonium in nuclear power plants has not yet begun. We have, therefore, an immediate opportunity—indeed we face our last chance—to develop and implement an effective national safeguards system.

More discouraging, however, is the fact that little discussion of this problem has occurred at the international level. There have been a few preliminary technical efforts. Moreover, Secretary Kissinger proposed on September 23, 1974 that the IAEA draft an international convention for enhancing physical security against theft of nuclear materials, including specific standards and techniques for protecting materials while in use, storage and transfer.

The risk of nuclear theft affects us all since plutonium or high-enriched uranium from the U.S. nuclear power industry could be used in a terrorist attack in some other country and material stolen in another country could be used to hold hostage a city in America. The time the world's political leaders have to deal with the problem is rapidly running out.

National safeguards systems should emphasize the *prevention* of theft and the detection of any theft attempt in time to prevent its completion. Detection of a completed theft, recovery of stolen material, and response to any nuclear threat involving stolen material are important supplementary safeguard functions. The physical barriers and security forces employed should be capable of defeating the maximum credible threat that can be reasonably expected. Such a threat might involve an attack by a group of perhaps ten to fifteen persons using sophisticated firearms and equipment. Insofar as practical, instruments and techniques should be developed and used to provide a timely and accurate picture of the material flows in the various nuclear fuel cycles, and to detect immediately the flow of any nuclear explosive materials out of a material access area through an unauthorized channel. After-the-fact accounting methods will be insufficient in view of the quantities of materials involved and the short response time available.

Co-location of nuclear fuel cycle support facilities—enrichment, fuel fabrication and chemical reprocessing—could virtually eliminate the transportation links that are most vulnerable to nuclear theft. Such co-location should be made a requirement in the U.S.

Under the existing safeguards approach in the United States, each operator of a nuclear facility is responsible for providing a private security force, intended to work in cooperation with local police, to protect nuclear explosive materials at the facility and during transportation. I do not believe such an extraordinary national security function should be imposed by fiat of the federal government on private corporations and state and local police. The private nuclear industry is in the midst of a demanding technological innovation under difficult economic circumstances. Local law enforcement authorities are already overworked, underpaid, and sometimes unable to cope with the present level of conventional violence in society. I believe we should establish a nuclear materials security service as a direct responsibility of the federal government. Furthermore, I believe that such a federal security force, with a narrowly limited function, can operate effectively with little or no impact on essential civil liberties and individual rights of privacy.

U.S. foreign nuclear energy policy

It should be readily apparent that a governmental policy decision to refrain from acquiring nuclear weapons and to accept the application of IAEA safeguards on civilian nuclear activities is reversible. A nuclear power posture is not.

Secretary Kissinger has stated that international nuclear transactions "can no longer be treated by anyone as a purely commercial competitive enterprise." Such transactions have never been treated this way. They have often been subsidized heavily by exporters and they have always been viewed politically by both exporters and importers.

Safeguards against diversion should not be bargained away in politically motivated competition. However, the central aim of U.S. foreign policy should be to encourage the worldwide development and use of nuclear power on a sound economic basis. Regardless of the conduct of other countries, the U.S. government should avoid the use of nuclear power reactors as political bargaining chips in the Middle East or elsewhere in the world. Moreover, the U.S. should reconsider the advisability of continued subsidies for export sales of nuclear materials or equipment.

If nuclear power were developed in the future with economic considerations primarily in view, only the largest national nuclear power programs would be self-sufficient. The remainder would be strongly interdependent. This is because of the economies of scale in nuclear fuel cycle operations.

For example, a gaseous diffusion plant for uranium enrichment involves very complicated technology and must have a very large capacity, capable of servicing 40,000 megawatts of nuclear power, to be economical. Gas centrifugation, though also very complex technologically, can be used efficiently in smaller plants, however. An economically efficient size for a nuclear fuel fabrication or reprocessing plant is one that serves a relatively large operable nuclear power capacity of at least 10,000 megawatts.

Thus, there is a strong economic argument against the construction of nuclear fuel cycle facilities—enrichment, fuel fabrication or chemical reprocessing—in any country until it has a large nuclear power capacity. There is also a solid commercial basis for the co-location of nuclear fuel cycle facilities and their construction and operation under multinational forms of ownership. In the development of a worldwide nuclear power industry, therefore, economic and security interests appear complementary rather than conflicting.

The U.S. could encourage the development of nuclear power interdependence in two important ways.

First, the U.S. could offer to provide its most advanced uranium enrichment technology for large enrichment facilities that would be built outside the United States under multinational ownership and IAEA safeguards. Such an offer was extended in 1971 and again as part of the International Energy Program growing out of the Washington Energy Conference in 1974. It must be pursued with urgency as part of a broader effort to encourage the multinational ownership and operation of chemical reprocessing, fuel fabrication and associated nuclear material storage facilities.

Second, in addition to the requirements for IAEA safeguards under the NPT or under U.S. agreements for cooperation with countries not parties to the NPT, the U.S. could adopt the following nuclear export policy: The U.S. would require that fuel used in power reactors exported from the U.S. and fuel enriched in the U.S. for use in foreign power reactors be reprocessed either in U.S. facilities or in facilities that were multinationally owned and operated under IAEA safeguards. Moreover, plutonium recovered from irradiated fuels would be stored at such facilities pending its fabrication into completed fuel assemblies and shipped for immediate recycling.

Such a U.S. policy would not succeed unless other countries develop a common view of nuclear power interdependence as being in their own long run economic and security interests. The non-nuclear-weapon countries must seize the present opportunity they have now—but not for long—to develop nuclear power on the basis of interdependence instead of self-sufficiency. The major industrial countries of Western Europe and Japan, the resource rich non-industrial countries, and the less developed countries need not be dependent upon the United States or the Soviet Union. Instead, they can develop cooperation among themselves. This is the kind of interdependence that will be most important.

Finally, the U.S. could require that exports of nuclear materials or equipment be subject in the importing country to physical security protection at least equivalent to that applied in the U.S.

In the nuclear era, it is clear from an economic viewpoint, and even more from a security viewpoint, that the interests of nations are becoming increasingly interwoven into an interdependent world.

BIOGRAPHY OF MASON WILLRICH

Mason Willrich is professor of law at the University of Virginia. He was Assistant General Counsel of the U.S. Arms Control and Disarmament Agency from 1962 to 1965. Prior to 1962 he was in private law practice in San Francisco. Mr. Willrich has served as consultant to the Ford Foundation, the RAND Corporation, the U.S. Arms Control and Disarmament Agency, and various private companies.

Mr. Willrich's latest book is *International Energy Politics*. His other publications include *Nuclear Theft: Risks and Safeguards* (co-authored with Theodore B. Taylor); *SALT: The Moscow Agreements and Beyond*; *Global Politics of Nuclear Energy* and numerous articles concerning energy matters and national security issues. Mr. Willrich graduated from Yale University in 1954 and received his law degree from the University of California, Berkeley, in 1960.

Senator SYMINGTON. Thank you very much.

Senator Javits, do you have any questions?

Senator JAVITS. Just one question, Mr. Chairman, then I really have to go.

First I would like to thank you both for this very highly professional and thoughtful testimony. It makes me feel very good about being with Senator Symington on this subcommittee.

ESTABLISHING MULTILATERAL RELATIONSHIP

Do you gentlemen have any ideas as to how we could advance the multilateral agreements which obviously are necessary in these various fields?

Mr. Taylor pointed out how they would help in the field of theft. Dr. Willrich has pointed out how they would help in freeing us to be more generous with both the technology and the material needed for power generation through the atomic fission without further jeopardizing the world's security in uncontrolled creation of atomic weapons.

But do you have any idea as to how we go about getting this multilateral relationship established? Would you do it through the Vienna agency? Would you do it through the multilateral conference? Would you do it as a condition for making available materials and equipment for these purposes?

Dr. WILLRICH. Well, Senator Javits, I think that a major part of moving in this direction is to convince the U.S. Government that it should move in this direction.

I think that there are numbers of decisions which have not been made. For example, the first thing we need to do is put our own house in order in this country as far as the national safeguards program is concerned. If we expect to achieve colocation of fuel cycle facilities abroad, we should require it at home.

If we expect to receive, or to achieve adequate physical security abroad for our nuclear efforts, we must be sure we have our own house in order.

Second, I think that, both within the private sector and within the Government, substantive knowledge of the details of the technology and the economics are missing at the higher levels and until people are aware of some of those details I do not think that they are going to be sensitive to the kinds of issues that need to be decided and the time frame in which those issues have to be decided.

This relates to the whole energy situation. What needs to be done is to consider the nuclear power situation, while recognizing the security risk as part of energy policy. The security aspect has to be fully recognized as we make decisions about future enrichment in this country and technology transfer, but also in swapping nuclear energy for oil and things like that.

So the first step is to solve our problem at home.

The second step is the development of a multinational framework. I do not think this kind of complicated policy venture is going to get very far in a series of quick initiatives. It is going to be a very complicated and long-term process where large numbers of people are going to have to be involved.

This country does not have an energy policy itself. This is part of energy policy.

Other countries do not have energy policies and yet we have come to grips with these kinds of problems. Otherwise they will go sliding out from under us.

Senator JAVITS, you put your finger on an institutional crisis, as it were, which is at the core of the energy problem. But I do not think it is going to be amenable to any quick solution. It is going to require a lot of patient involvement by people at the top level and it is going to take a lot of top level time to deal with it.

So far that top level time has not been devoted.

Senator JAVITS. Expended. Yes.

Dr. Taylor?

Dr. TAYLOR. I want to add just a couple of points. First, I agree with everything he said.

THREE KINDS OF DISCLOSURE TO ADVANCE MULTILATERAL RELATIONSHIP

I think there are three kinds of discourse that should be going on internationally and they are all going on to some extent.

One is discourse that involves rather informal intergovernment types of get-togethers.

For example, in the last few months, the AEC—Atomic Energy Commission—and now the Energy Research and Development Administration has been inviting groups of foreign technical people mostly to come and talk about physical security laboratories at Sandia Laboratories in Albuquerque. They have shown off some things they are very proud of that are under development.

But apparently that is a two-way street. We have heard a lot from the French, British, and Dutch recently that look like very good ideas that have not occurred to us.

So that kind of exchange, which is sort of semiofficial, I think, is going on and a lot can be done even unilaterally by the United States to encourage that.

A second kind of discourse you might call sort of academic, in the sense of exchanging the views of very thoughtful people. I would say the best minds available in the world should address themselves to these problems and how to cope with them in a free exchange of information and ideas through symposia, writing by people involved in all of this, and so on, with a focus on international direction of these ideas.

There have been a number of international symposia on the safeguards question and it has generated a very healthy environment at a very informal level.

I think that that is accelerating and ought to be encouraged by organizations like the National Science Foundation and their counterparts in other countries.

The third area, which is the one that is really necessary to implement any formal understandings and agreements is at the diplomatic level. Now, I personally believe that the International Atomic Energy Agency is a very good forum for that. The reason I say that is primarily because essentially every government that is going for nuclear power in any significant way whether they have signed the NPT or not are active participants in the IAEA.

I am not suggesting that that should be the only rather formal level of discourse. The NPT Review Conference would be another which is different from that.

Perhaps there would be some point in setting up conferences prior to the convening of the formal mechanisms to implement some international conventions. That may be completely outside the context of the organizations I spoke of.

These things are happening and they are happening on an accelerated scale. These are the bases for the hope that I have that the world will face up to this problem and get cracking and solve it. The dam is about to break. We have very few years left. I think that is one of the reasons why I point to holding action, like the—

“THE DAM IS ABOUT TO BREAK”

Senator SYMINGTON. What do you mean, “the dam is about to break?”

Dr. TAYLOR. What I mean by that is whatever forces are restraining countries from going to nuclear weapons and nonnational organizations from going to nuclear weapons, I think with a continuation of even the trends seen in the last 5 years that the structure that prevents this, whatever it is, will break and we will see proliferation all over the place and nuclear violence to a level that I think most of us cannot tolerate.

Senator JAVITS. And also the possibility of tests. In other words, it takes just one such incidence and you watch the action take place.

Dr. TAYLOR. On all fronts. I am sounding perhaps a little vigorous about this because these are not new questions. These are not new risks.

The whole story about the relative ease of stealing material and ease of constructing nuclear explosives, whether by a national or terrorist organization, has been squarely placed in front of authorities in this country and in other countries and the IAEA for at least 10 years. If you look at the action up through about 1972, it was essentially negligible with the one big exception, in my mind, of the NPT, that gave the IAEA the charge of a sort that was necessary, but certainly not sufficient to bring this under control. I think without the NPT the IAEA would still be floundering around wondering what to do.

PROBLEM OF PEOPLE'S PREDILECTION FOR VIOLENCE

Dr. WILLRICH. May I continue on this because I think I have a different view from Dr. Taylor, in spite of the fact that we are co-authors and good friends?

Senator SYMINGTON. Of course.

Dr. WILLRICH. I would say the following, Mr. Chairman: I think we all have to recognize as to the possibilities of diversion by criminal or terrorist groups and also, to a lesser extent, governmental diversion, that you are dealing with a problem that is basically inherent in the world situation. That problem is people's predilection for violence.

What can influence this more than anything else is whether terrorism as a phenomenon or criminal behavior as a phenomenon grows or diminishes. Such developments are outside of the control of all these elab-

orate mechanisms that we are trying to develop to deal with proliferation.

One of the things that bedevils the nuclear power industry is the fact that the generating force for creating that problem really is not the plutonium; it is the people.

And so I think that we have to recognize that we are going to be living in a much more dangerous world than we have in the past and that maybe we had better start behaving somewhat differently on the human side.

SUDDEN RAPID PROLIFERATION QUESTIONED

But I do not know, I think it is impossible to forecast a quick breakdown in the present constraints on nuclear weapons proliferation. I can see the whole thing going slowly, even with very little in the way of safeguards. I would feel awfully uncomfortable, but I cannot look ahead and say for sure that all of a sudden we are going to have rapid proliferation. I think it may continue to be a rather slow process.

Senator SYMINGTON. Thank you very much.

I have a few questions I would like to ask.

LEASING NUCLEAR FUEL RODS FOR BETTER CONTROL

Dr. Harold Agnew, who runs the Los Alamos Laboratories, says leasing of nuclear fuel rods would be a means of better control instead of an outright gift or sale.

Could you comment on this recommendation?

Dr. WILLRICH. Well, I do not think it makes a whole lot of difference in the long run. The main thing is whether, along with the lease, it is agreed that you are going to return the fuel rod to some other country to be reprocessed. But a lease can be broken just as easily as a treaty. If you are worried about that; yes.

In the United States, as you recall, up until 1973, a large amount of the fuel in the nuclear power industry was actually leased rather than owned. That was gradually phased out from 1964 to 1973. I do not think that some sort of legal situation like that is going to make a large difference.

Of course, depending upon the financial arrangements, the lessor may wind up with a huge capital investment, say, the United States, that would be impossible to sustain.

So I do not view that as being a long-term solution or a long-term way to structure what has happened or what is happening.

Senator SYMINGTON. Thank you. Dr. Taylor, would you comment?

Dr. TAYLOR. I would say if the spirit of that is to keep control of the material and I think that is what Dr. Agnew has in mind.

Senator SYMINGTON. Right.

Dr. TAYLOR. Then that is a specific way of putting it, yes.

The more general proposal that we agree that the fuel, when it is taken out of the reactor, will come back to us or some agent to be specified the way leased material would, in that sense I think it is a good idea.

There may be some economic pros and cons of using the formal mechanism of a lease rather than a treaty and I just have not thought about that enough to have any strong opinions one way or the other.

Dr. WILLRICH. Who would be the lessor?

Senator SYMINGTON. I presume the fellow that had the rods.

ENCOURAGING RATIFICATION OF NPT AND SUBSCRIPTION TO IAEA SAFEGUARDS

My final question is, what further steps might the United States propose to encourage additional nations to ratify the NPT and subscribe to the IAEA safeguards.

Dr. TAYLOR. I have one point I would like to make in answer to that. That is this; I do not see much evidence that we have faced up to what really causes people not to sign the Non-Proliferation Treaty and that no evidence that nuclear weapons are a good thing to have. We have them and we think we need more. The Soviets have them and think they need more. I think we have done much too little in the way of putting ourselves in others' shoes, really trying to view the world from the point of view, for example, that was expressed by the Indian Ambassador to the United Nations. I think we need to do that very carefully because it is only, I believe, by taking steps to show that we do not want nuclear weapons either, and that we would give them up if we were somehow able to convince our antagonists to do the same thing, that we are much more likely to get more people on a bandwagon of real intent to abide by the terms of the treaty.

I cannot see India changing its policy on the basis of much of anything that we have done that does not get at the root of the problem.

Dr. WILLRICH. I would subscribe to what Dr. Taylor has said and add to it the thought that in my judgment, nonproliferation, vertical or horizontal, has never been a very high priority in U.S. policy. That is not just the present priority, but rather one that stretches back over a long period of time and crosses administrations.

I think that nonproliferation policy, especially horizontally to other countries, constantly collides with other foreign policy objectives that the United States has been seeking with other countries. When it comes to making priority adjustments, the top priority is given to other policies rather than the nonproliferation policy.

So in the crude cost-benefit analysis that goes on in foreign policy decisionmaking, nonproliferation winds up second, third, or fourth.

COMMENDATION OF WITNESSES

Senator SYMINGTON. Thank you very much, gentlemen. I became very interested in this problem some years ago, and then more recently I read the story about you in the book, "The Curve of Binding Energy," and I called up Dr. Agnew and asked him if he thought you were a nut.

I could not believe what I was reading, even though I am on the Armed Services and Foreign Relations Committees, and chairman of the Military Applications Subcommittee of the Joint Atomic Energy Committee.

His reply was, "A nut? Why, he designed some of our most effective fission bombs."

So I want to assure you that we have great respect for your opinion and Dr. Willrich's opinion, and I intend to see this through so that the people will know more about it than they do today.

I appreciate very much your coming today.

Dr. TAYLOR. Thank you very much, Senator. I would like to pledge, I think for both of us, who are into this up to our ears, and speaking for myself, and I think probably for Mason, we want to pledge whatever help we can to you, or anybody else who is in this trying to do something about it.

IMPORTANCE OF PROBLEM

Senator SYMINGTON. We will continue to try to bring this information to the people. To my mind it is the most important problem the world faces today.

I think we all agree if we have a full nuclear confrontation that that will be the end of civilization as we know it.

Do you agree with that.

Dr. TAYLOR. I agree with that.

Senator SYMINGTON. Do you agree with that, Doctor?

Dr. WILLRICH. I certainly do, Senator.

Senator SYMINGTON. Thank you very much.

The hearing is recessed, subject to the call of the Chair.

[Whereupon, at 4:24 p.m., the subcommittee adjourned, subject to the call of the Chair.]

NON-PROLIFERATION ISSUES

WEDNESDAY, APRIL 16, 1975

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, Church, Clark, Case, and Javits.
Senator SYMINGTON. The hearing will come to order.

OPENING STATEMENT

Today, the Subcommittee on Arms Control, International Organizations and Security Agreements of the Senate Committee on Foreign Relations commences hearings on the accords reached by President Ford and General Secretary Brezhnev last November in Vladivostok. These accords provide the basis for negotiations on a strategic arms limitation agreement which are now underway in Geneva.

These negotiations are of the greatest importance. Unless we achieve a broad and effective agreement on arms limitations, we could spend billions more on nuclear weapons in the years after Vladivostok than ever before.

Now the Congress has an unprecedented opportunity to review the terms of the Vladivostok accords prior to a final agreement.

SUBCOMMITTEE DELIBERATIONS

This morning and in subsequent hearings the subcommittee will examine various issues raised by the accords and provide groundwork for thorough congressional review and possible recommendations.

As part of its deliberations, the subcommittee will also consider the protocol to the Treaty on the Anti-Ballistic Missile Systems (ABM) which was signed in Moscow last July.

ABM TREATY AND INTERIM AGREEMENT

The first phase of the strategic arms limitation talks (SALT) culminated in May 1972 with the ABM Treaty on defensive systems and the interim agreement on offensive systems. The former limited ABM launchers to a nominal level of two complexes for each country. The

latter restricted U.S. and Soviet land- and sea-based strategic nuclear weapons during the period 1972-77.

ABM TREATY PROTOCOL AND VLADIVOSTOK PRINCIPLES

The second phase of SALT has produced a protocol to the ABM Treaty which reduces the number of ABM complexes permitted for each country from two to one. SALT II has also produced an outline of principles, agreed to at Vladivostok, for a 10-year agreement on strategic offensive arms designed to replace the interim agreement which is due to expire in 1977. Negotiations are now in progress to convert these principles in a formal agreement.

This new agreement, which the administration expects to reach before the end of 1975, would incorporate relevant provisions of the interim agreement, and would last until 1985. It would also go further and limit both sides to an aggregate of 2,400 strategic delivery vehicles (including land and sea-based missiles and heavy bombers). Additionally, both sides would be limited to 1,320 missiles with multiple independently targetable reentry vehicles (MIRV's).

The Vladivostok accords do not restrict U.S. strategic aircraft deployed overseas or French and British nuclear delivery systems. The withdrawal of Soviet demands for compensation for these systems could be significant.

The administration has presented the Vladivostok accords as a major arms control achievement which (1) caps the nuclear arms race, (2) promotes détente, and (3) makes possible additional progress in arms control.

The ceilings on strategic delivery vehicles and MIRVed missiles, according to the administration, will reduce uncertainties in the force planning of both sides and provide a useful framework for negotiating nuclear arms reductions during the next phase of SALT.

CONCERNS OF VLADIVOSTOK ACCORD CRITICS

Critics of the tentative Vladivostok accord have expressed a variety of concerns, including the following:

(1) That it does little to constrain new developments in strategic weapons (the so-called qualitative arms race).

(2) That it may make further reductions more difficult to achieve, in that it allows both sides to modernize all 2,400 permitted vehicles.

(3) That it does not provide for equality in throw weight or numbers of warheads—both of which are often mentioned as the most important measures of strategic strength. These critics are concerned that a Soviet advantage in missile throw weight, combined with improvements in Soviet missile accuracy, could provide the Soviet Union with a capability for attacking hardened ICBM (intercontinental ballistic missile) silos.

(4) That it places a ceiling on MIRV's far in excess of present deployment levels, particularly those of the Soviet Union.

UNANSWERED ISSUES OF VLADIVOSTOK ACCORD

Additionally, both critics and supporters of the Vladivostok accords have observed that the value of any final agreement will

depend in large measure on how a number of yet unanswered issues are resolved. These include:

(1) Difficult problems involving how various aspects of the agreement are to be verified.

(2) Definitional problems, such as determining what characterizes a "heavy" bomber.

(3) How new classes of weapons, such as mobile missiles, will be treated.

(4) What kinds of provisions will be included to insure that subsequent negotiations toward reductions in various types of weapons will be undertaken.

The many questions which are raised by the Vladivostok accords also come before us at a time when several significant changes in our overall doctrine for the procurement and use of nuclear weapons are being discussed. As we progress with our hearings, we will want to examine closely how our negotiations on nuclear arms control relate to critical issues of strategic doctrine.

WITNESSES

This morning I would like to welcome:

Ambassador Gerard C. Smith, former Director of the Arms Control and Disarmament Agency, and head of the U.S. delegation to the first strategic arms limitation talks (SALT I);

Dr. Wolfgang K. H. Panofsky, director of the Stanford linear accelerator, Stanford University; and

Dr. Paul Doty, professor of biochemistry, Harvard University.

Our witnesses have been asked to discuss the national strategic policy and arms control implications of the Vladivostok accords.

Ambassador Smith, would you please come forward.

May I say that in the years that I have been involved in this subject, it is my considered opinion that no one knows more about the subject than you do, Ambassador Smith.

We are very glad to have you with us this morning. It is my understanding that you have a prepared statement.

[Mr. Smith's biography follows:]

BIOGRAPHY OF GERARD C. SMITH

Gerard Smith graduated from Yale 1935, B.A., Yale Law School 1938, LL.B. Practiced law in 1938 to 1941, General Motors Corporation, Legal Department. United States Navy, Ensign—Lieutenant 1941 to 1945. Practiced law, John Thomas Smith & Son, Smith & McInerney, Gerard C. Smith 1946 to 1950.

Governmental positions held

Special Assistant, Atomic Energy Commission 1950 to 1954.

Special Assistant to the Secretary of State for Atomic Affairs, Department of State 1954 to 1957.

Deputy Chief, U.S. Delegation Negotiating International Atomic Energy Agency Treaty 1955 to 1956.

Chief Political Advisor, First Atoms-for-Peace Conference 1955.

Chief Political Advisor, Technical Talks with Soviet Union on Safeguards Against Diversion of Nuclear Materials Weaponry 1955.

Liaison Officer for Foreign Relations Committee of Disarmament Affairs 1957.

Chief Aide to Secretary of State, London Disarmament Conference 1957.

Assistant Secretary of State and Director, Policy Planning Staff 1957 to 1961.

Consultant, Policy Planning Council 1961 to 1969.

Special Advisor to Secretary of State for Multilateral Force Negotiations 1962 to 1964.

Director, United States Arms Control & Disarmament Agency 1969 to 1972.

United States Chief Delegate to the Strategic Arms Limitations Talks 1969 to 1972.

Mr. Smith is presently practicing law with Wilmer, Cutler & Pickering and is the North American Chairman of The Trilateral Commission, a private effort to improve cooperation between Japan, North America and Western Europe.

During his years as a lawyer, before 1950, he was a Director of the following corporations: Argonaut Mining Company, Omar Bakeries, Sisco Goldmines, White Knob Copper and Development Corporation, Ecuadorian Corporation and Gaynor Electric.

Honorary Degrees: Yale Doctor of Laws, Georgetown Doctor of Laws, Johns Hopkins Doctor of Laws, Loyola Doctor of Laws and Notre Dame Doctor of Laws.

Admitted to practice in courts of New York—Federal Court, Second District; Second Circuit, Southern District—Supreme Court of the United States and District of Columbia.

Professional positions

Foreign Policy Consultant, Washington Center Foreign Policy Research, 1961; Member, Council on Foreign Relations from 1961; Member, Executive Committee, Yale Law School Association, 1962; Member, Law Committee, Yale University Council, 1964; Director, American Security & Trust Co., 1964 to 1969; Trustee, Sheridan School and Canterbury School, 1967–1969; Director, Atlantic Council of the USA, 1967–1969; Publisher, Interplay Magazine, 1967–1969; Director, School of Advanced International Studies, Johns Hopkins University, 1967; Trustee, The Brookings Institution, 1973; Director, Panhandle Eastern Pipe Line Company, 1973; Trustee, Catholic University of America, 1975; Director, Arms Control Association, 1975.

Mr. Smith is a Roman Catholic. He belongs to the following clubs: Racquet and Tennis Club, N.Y.C.; National Golf Links, Southampton; Chesapeake Bay Yacht Club, Easton, Maryland, Metropolitan Club; Chevy Chase Club; Alibi Club.

Home address: 2425 Tracy Place, N.W., Washington, D.C. 20008.

STATEMENT OF HON. GERARD C. SMITH, FORMER DIRECTOR OF ACDA, AND CHIEF NEGOTIATOR OF SALT I AGREEMENT

Mr. SMITH. Thank you, Mr. Chairman.

I propose to discuss this morning some of the arms control implications of Vladivostok as well as certain related aspects of the current Defense budget submission.

At the start let me say that I put forward these ideas tentatively, not categorically. I question that anyone can speak with certainty about the slipper issues surrounding strategic arms and their control. I admit to a bias in favor of a very strong defense, but I believe that arms control can also advance the security of the United States and the world whether or not there is some relaxation of tensions between the United States and the U.S.S.R.

SIGNIFICANCE OF VLADIVOSTOK ACCORD

The Vladivostok accord should not be judged in and of itself—but in connection with the limit on defensive systems (ABM's) agreed upon in 1972 and other American-Soviet agreements relating to arms control. It may help in judging the significance of Vladivostok to see that accord as part of a process that has been going on for more than 5 years. The general strategic dialog of the 1960's led to the specific SALT exchanges of 1969–72 at Helsinki, Vienna, Washington, and

Moscow. Gradually the two sides developed somewhat better understanding of each other's strategic preoccupations.

Concerns about accidental or miscalculated nuclear hostilities led to the first two SALT agreements in 1971—on measures to reduce the risk of outbreak of nuclear war and on measures to improve the Washington-Moscow direct communication link or "hot line." In 1972 there was the major breakthrough, the treaty limiting ABM's to two sites apiece, accompanied by the interim agreement to freeze offensive launchers at the approximate levels of 1972. These were followed in 1973 by the Nixon-Brezhnev agreed principles for offensive arms limitation and in 1974 the ABM Treaty levels were reduced to one site apiece. At year's end the Vladivostok accord foreshadowed limitations on offensive systems which although of relatively short duration may be considered as a counterpart to the ABM Treaty.

I might interject that although this agreement is often referred to as a 10-year agreement, actually, it is an 8-year agreement, since it does not go into effect until 1977, and terminates in 1985.

In judging this latest agreement one should consider the cumulative effect of the entire SALT process which hopefully can be considered as a preparatory stage for the natural next steps—reduction in offensive force levels which the sides are now committed to negotiate and some limitation on improvements in weapons characteristics. A total ban on ABM systems should also be reconsidered.

I would not favor interrupting the current Geneva negotiations by introducing a proposal for reductions. I do not believe that reductions are negotiable now. The Soviet position since 1968 has called for first a limitation and subsequently for reductions. When and if the Vladivostok accord is converted into a definitive agreement, the United States should promptly table a reduction proposal such as its 1970 SALT call for reducing strategic force levels by 700 launchers.

I might point out that No. 1 is the same one that is contained in Senator Jackson's recent proposal for reduction.

I think Vladivostok marks progress because the Soviets agreed that both sides should have the right to deploy an equal number of strategic launchers. This involved a Soviet withdrawal from its position maintained for more than 5 years that the alleged American advantage in forward based systems (FBS) justified some Soviet advantage in numbers of strategic launchers. It also involved the waiving of the Soviet claim that U.S. submarine bases in Europe and French and British ballistic missile submarines justified larger strategic forces for the U.S.S.R. I would strike a note of caution here, we probably have not heard the end of this FBS argumentation. When one gets into reduction negotiations, it is to be expected that Soviets will revive this issue.

CONVERSION OF VLADIVOSTOK ACCORD INTO DEFINITIVE AGREEMENT

Another word of caution—it will not be easy to convert the Vladivostok general accord into a definitive agreement clearly spelling out the details of what is controlled and how. I notice there is a tendency to take for granted that there will be a successful outcome to the current Geneva negotiation. It seems to me this is a poor background for any international negotiation.

I would say, incidentally, Mr. Chairman, that, to my mind it is poor approach on our part to enter into agreements which the British would call "Heads of Agreement," leaving the details to be worked out, because then the pressure is more on us than on the Soviets to work out specifics of such things as verification. If those specifics had to be worked out before agreement was reached, I think the pressure would be more nearly equal. If you have an agreement in principle, think the tendency may be more for the United States to give on questions of verification, than for the Soviets, since they are so much less interested in verification. They have all the verification capabilities they need in terms of the output of our free society describing our weapon systems and our future programs.

LIMITATIONS ON LAUNCHERS

The limitation on launchers at 2,400 is admittedly high. But it is about the level that U.S. strategic launchers reached over 10 years ago. It is not far from the number that we would have settled for in 1971 during SALT I. It is substantially lower than some U.S. intelligence estimates of Soviet forces projected out to 1985 in the absence of agreement. If the Vladivostok accord evolves into a formal limitation agreement the United States will have good assurances of the maximum number of Soviet launchers over the next decade. That should eliminate what has been a driving force behind the strategic arms competition—from the American standpoint—uncertainty as to what Soviet future force levels would be. The elimination of this uncertainty should be a factor for stability in the American-Soviet strategic relationship.

I think the MIRV limit of 1,320 launchers is less significant, but I would recall that during 1969-72 the United States would have settled for an offensive agreement with no MIRV limitation at all. It seems clear that the Soviets have a capability to deploy many more than 1,320 launchers for MIRV missiles if not restrained by agreement. But it also seems clear that our hopes of moderating the threat to Minuteman by a MIRV control arrangement have not been fulfilled.

MINUTEMAN VULNERABILITY

As this subcommittee well knows, Minuteman vulnerability has been a concern for a number of years. Recently it seems to me the Pentagon has been issuing rather uncertain signals on this score. For instance, testifying before this subcommittee on March 4th of last year, the Secretary of Defense said, "There is just no possibility that a high confidence disarming first strike is attainable for either side even against the ICBM components of the strategic forces on both sides." In January of this year at a press conference, Mr. Schlesinger said that should multiple missiles be "massively deployed" by the Soviet Union this would be a "potential source" of strategic instability and the United States would have to watch to determine whether "to take countermeasures to maintain the strategic balance."

In the statement of the Director of Defense Research and Engineering to the Congress this year, speaking of the proposed United States advanced ICBM, Dr. Currie said, "The pace of this program has been significantly reduced as a result of our judgment concerning the time scale of the threat to land based ICBM's . . ." But in the same report

he says, "... there is little question that our present land based missiles deployed in fixed silos could be in jeopardy by the mid-1980's" and "The severity of this threat definitely has increased in the last year and my concern has consequently deepened." He seems to be saying in these two statements that although the proximity of the threat is lessened, its severity has increased.

I suggest that this subcommittee make an effort to clarify present estimates about the future vulnerability of the Minuteman force and its significance. If the Minuteman force is to become so vulnerable that it cannot be relied upon even for the somewhat lessened role that the present concept of the Triad requires, it is hard to understand the substantial effort that we are proposing to make to develop a new ICBM especially if it is to be deployed in a fixed silo. If it is to be a mobile missile (and I note that General Brown in his report to the Congress states that mobile missiles will be permitted under the Vladivostok ceilings) would it be helpful in carrying out any "hard target" aspect of the "new strategy" of flexible response that we are pursuing? On this score, I note that General Brown at page 15 of his statement says, "Reliability, accuracy, and availability are reduced considerably by the problems inherent in mobility while operating costs including maintenance, security and positive control are substantially higher than those associated with fixed deployment." In any event the Minuteman vulnerability threat continues to be seen as a relatively long-range future problem and not even then an unlimited danger to American ICBM's.

MOBILE MISSILES

I am sorry to hear that mobile missiles are to be allowed under the Vladivostok formula. You will recall in SALT I that we made a major effort to rule mobiles out and when the Soviets would not agree the United States made a formal statement "that the United States would consider the deployment of operational land mobile ICBM launchers during the period of the interim agreement as inconsistent with the objectives of that agreement." I feel that the Soviets would get more advantage out of land mobile missiles than would the United States.

The U.S.S.R. has substantially more uninhabited real estate and it has a population that is not in a good position to object to weapons deployments. I believe that if the United States decides to deploy mobile ICBM's, there will be a popular reaction similar to that in 1969 to proposed deployments of ABM's—even if the deployment is limited to military reservations. There may also be a verification problem in keeping accurate track of the number of mobiles deployed by the U.S.S.R.—especially if the so called garage technique is used.

NEW U.S. STRATEGY AND CIVIL DEFENSE

I am concerned about the effect on the prospects for arms control of the United States moving more to an ICBM silo busting strategy. The general assumption behind the ABM Treaty was that with both sides possessing a capability to destroy the other, nuclear war could be deterred and that efforts to blunt a nuclear attack by missile defense could be destabilizing and in a crisis could set up pressures for a first strike especially if populations were defended. I believe a limited strategic war counterforce strategy could produce a similar result.

To make such a strategy credible the Secretary of Defense correctly has concluded that population protection from fallout will be necessary and the current defense budget calls for a development program which foreshadows a major shelter program in the years to come. Secretary Schlesinger says in his report to Congress: "One would expect that the recent shift in emphasis towards a more flexible strategic response policy . . . would be reflected in our civil defense program. That is indeed the case. We are seeking to reflect in our civil defense planning the wider range of response options that we are now introducing into our military planning." He then goes on to point out that the Soviet Union has given a good deal of attention to civil defense with shelter construction and plans for evacuation of a bulk of the population from major cities in the event of a crisis. He says, "We believe the United States should have a similar option for two reasons: (1) to be able to respond in kind if the Soviet Union attempts to intimidate us in a time of crisis and (2) to reduce fatalities if an attack on our cities appears imminent." I think that the Secretary of Defense's discussion of the shelter program requirements is well worth the attention of this subcommittee. It starts at page II-54 of his statement. In past years we have pursued a small civil defense effort as a kind of improbable contingency program, but if civil defense is to become essential to the credibility of our new nuclear strategy we shall have to expect a major effort in this direction.

A decision to enter a civil defense competition between the United States and the U.S.S.R. would need very broad support by the American people. Coming just after SALT agreements which are said to have reduced the risk of nuclear war, a major civil defense program will need a great deal of explanation. Perhaps this is necessary, but I think that we should enter such a program only with our eyes wide open to its implications.

NEW STRATEGY AND CIVIL DEFENSE

There is one additional possible concomitant to the new strategy that I think warrants attention. As we get into a major civil defense program I think pressures will build up to abrogate the ABM Treaty. It may seem illogical to be making major evacuation plans of our cities while depriving ourselves of the ability to directly protect our population by active defenses.

In addition to the possible loss of the ABM Treaty and the necessity for a major fallout shelter and evacuation program I notice that Mr. Currie at page V-10 of his report to the Congress refers to "the fact that we could in principle launch our ICBM's upon unequivocal warning . . ." If we are contemplating the possibility of striking the Soviet ICBM's in a limited strategic war with the reciprocal possibility of their first striking our ICBM's in a limited strike this, to my mind, pernicious concept of "launch on warning" will probably again become a matter of interest.

I am not arguing that there is no need to be concerned about the very large Soviet ICBM buildup with the prospect of a good part of these launchers having MIRVed missiles in the future. But the Soviet deployment strikes me as a form of psychological pressure by which the U.S.S.R. aims to get political value from a form of military power

for which there can be no other rational use. Over the years the United States by many statements has proved how sensitive it is to this modern form of "force in being." Although it violates our ideas as to how the Soviet-American strategic relation should be managed, it does not seem surprising that the U.S.S.R. continues to press on this sensitive area.

I question whether trying to match the Soviet ICBM force would be a sensible course. One can assume with some confidence that the U.S.S.R. would not react to such an American deployment with statements expressing concern about the resulting vulnerability of their ICBM's. Perceptions around the world about the vulnerability of U.S. ICBM's that may have been generated by American statements would likely persist unmatched by similar perceptions about Soviet ICBM's.

Would it not be better to moderate our annual expressions of concern about Soviet ICBM's and get on with modernizing those elements of our strategic forces not threatened by Soviet ICBM's. Last year's clear acceptance of the Triad concept as not requiring each of the three components of U.S. strategic forces to be an independent deterrent force seems a step in the right direction. And if as the Secretary of Defense says, the U.S.S.R. cannot mount a disarming first strike against Minuteman, would it not be as reasonable to learn to live with their vulnerability to a lesser than disarming strike as it is to live with the present vulnerability of our cities?

UNITED STATES IN A REACTIVE PHASE

I am struck by the fact that we seem to be in a reactive phase of strategic policy and programming. In past years I had the impression that the United States had the initiative in weapons design and strategy. Now we seem to be reacting more to Soviet moves. For example, since the Soviets seem to be deploying a force which may put our ICBM's in jeopardy in the 1980's we are taking preparatory steps to match it. The Soviets seem to be developing mobile ICBM's. We are preparing the way for such a force. It is said that the Soviets may be developing a strategy of selective use of nuclear weapons in a limited strategic nuclear war. We should follow suit. The Soviets have elected to have large throw-weight missiles. We may have to do the same—even though in the late 1950's we deliberately decided not to go that route.

It does not seem unfair to ask—if the U.S.S.R. starts to deploy battleships should the United States recommission its battleships? The U.S.S.R. has civil defense plans for evacuation of civilians. We should prepare to do the same—all this in good part to avoid perceptions abroad and at home that we may someday become second best. It seems to me that this concern has a large potential for being a self-fulfilling worry. People read and hear constantly about American concerns as to its strategic forces.

The Soviets do not talk this language. People constantly read and hear from American sources about the threat from very large Soviet ICBM's and how American leaders in the future might have to give in to Soviet coercion unless our weapons and strategy are changed. It would not be surprising to me if after years of this sort of public output people might begin to believe that U.S. strategic forces had lost their capability to deter war.

On this very important question of how people abroad and at home will perceive the relative strength of the American and Soviet strategic forces in years to come I notice that in recent months it is our defense leadership that has done most of the estimating of future perceptions—estimating the future psychology of peoples is difficult business at best—and one in which nondefense officials, one would think would have greater expertise. We have missed presidential foreign policy reports in 1974 and 1975 which should be the best vehicle for such grazing into the murky future. Let us hope this practice will soon be resumed.

Admittedly, our defense officials have a hard job to convince a somewhat complacent public of the need to support a very strong military establishment. It is not my aim to make this task more difficult. But I recommend that much more be said about the immense and persisting deterrent power of our strategic forces.

SUMMARY OF POINTS

In summary, I have tried this morning to make the following points. The Vladivostok accord if converted into a sound agreement will mark another step in the long process of bringing strategic arms under control.

The Minuteman vulnerability problem needs continuing clarification. The threat to this force apparently is not near term and admittedly it is not possible for the U.S.S.R. to destroy this force.

Mobile ICBM's do not appear to be a good way to meet the vulnerability problem and their deployment could result in an advantage to the U.S.S.R.

The new U.S. strategy to be credible will require a major civil defense program. Will Americans support such a program?

U.S. strategy and development programs seem unduly reactive to Soviet moves and our rhetoric too defensive.

I thank you.

Senator SYMINGTON. I thank you, Mr. Ambassador.

WHAT MR. SMITH WOULD HAVE SOUGHT AT SALT II

Ambassador Smith, you left the Government after taking a leading role in bringing about the SALT I Treaty and Agreement. Had you remained as our chief SALT negotiator, and Director of the Arms Control and Disarmament Agency, would what you have sought in SALT II differ from what has been achieved, and, if so, in what ways?

Mr. SMITH. Well, Mr. Chairman, it is awfully hard to answer a hypothetical question, and perhaps one can say that the dog would have caught the rabbit better, but I think I have said on a number of occasions that I think the Vladivostok agreement, while not a matter to be triumphant about, does mark progress, and I believe it goes in the direction that I would have tried to push it had I had responsibility.

Senator SYMINGTON. Thank you.

SHOULD FINAL VLADIVOSTOK AGREEMENT BE BROADENED?

Given what is incorporated in the Vladivostok accords, do you believe the final agreement to be derived from Vladivostok should be broadened in any way?

Mr. SMITH. Well, as I mentioned in the statement, I don't think one should inject into the Geneva accords presently going on anything of substance that was not foreshadowed in the Vladivostok accords, such as reduction or qualitative control. I would think that as soon as you have a definitive agreement reflecting Vladivostok, we should then press the Soviets to get on with a reduction program, and to get on with qualitative controls hopefully to moderate or block further improvements in offensive strategic weapons.

I would also hope that we would press for a complete ban on all ABM's to eliminate the one site possibility that is still open.

VALUE OF COMPLETE BAN ON ABM'S

Senator CASE. I wonder if you could develop that point further. Why do you think it is important to spend a great deal of time on a ban on all ABM's? I suppose it would take a great deal of time and energy, too. What is the great value of eliminating one site on each side?

Mr. SMITH. Well, first of all, Senator Case, let me say I don't think that this would take a great deal of time. It took a lot of time to work out an agreement for two sites, because you had a lot of preoccupation about the radar base to support even a very small ABM program. But if you went to zero, I think that the modalities would be rather simple to work out, so I don't think it would take much time.

Now, as to why I think that would be useful, it seems to me that having one site on each side is militarily insignificant, and I think that it does leave open the possibility of suspicion building up as to whether the one site is the nucleus for a broader area defense of a nationwide ABM system. People will look at large radars being built, perhaps for early warning, or for air traffic control, and start surmising that is the basis for a quick deployment by the Soviets of a new ABM system.

Now, if the ABM's were completely banned, it seems to me the possibility of that sort of suspicion growing up would be substantially moderated.

Senator CASE. You don't think there is any positive value in keeping a single site on our side, for example, as a means of developing this for our affirmative use, or as a basis for further deployment in the future?

Mr. SMITH. Well, I don't think keeping the present site out at Grand Forks—

Senator CASE. Or the other?

Mr. SMITH. Or the alternative would be to build a new site around the Capitol, for which the Congress has shown no disposition to act at all, and I would think that both sides would be better off, and the situation would be somewhat more stable if ABM's were ruled out.

Senator CASE. Thank you, Mr. Chairman.

WHY SOVIETS DROPPED INSISTENCE ON INCLUDING FORWARD BASED
SYSTEMS

Senator SYMINGTON. Why do you believe the Soviet Union was willing to drop its insistence that forward based systems be included in SALT II? Do you think that is only temporary, and will come back in future negotiations? What are your thoughts about that?

Mr. SMITH. Well, I think that the Soviets wanted to have an offensive agreement. They saw that the interim agreement was facing termination in 1977. I think that they felt that these very high levels of 2,400 launchers, which are substantially above the present American launcher level, and somewhat, if I understand correctly below their launcher level, and with the prospect of the United States building up the number of its launchers over the next 8 years, being not very great, I would think the Soviets probably calculated that they had built into this agreement a de facto compensation, if you will, for the forward based system, the British and French boats, and the ports of Rota and Holy Loch we are permitted to have. I do think it will not go away, Mr. Chairman. I think that if and when we get into the negotiations about reduction this obstacle will be raised again by the Soviets.

SOVIET WILLINGNESS TO OMIT EUROPEAN STRATEGIC FORCES

Senator SYMINGTON. Why do you believe the Soviets were willing to omit European strategic forces from the formula for agreement?

Mr. SMITH. Well, I think in effect that was covered by my answer to the previous question. I think that the American theses was that SALT only covered Soviet and American strategic weapons. The Soviets injected the French and the British submarines. I don't think they ever referred to the fact that the French have another marginal strategic system in their IRBMs (Intermediate Range Ballistic Missile). They probably concluded that at this high level, 2,400, there was no need for them to press on that point.

THROW-WEIGHT DISPARITY

Senator SYMINGTON. As you know, the complaint has been heard that Vladivostok leaves the United States at a large disadvantage in terms of throw-weight. Do you consider this disparity meaningful?

Mr. SMITH. Well, I think that in the abstract it isn't too meaningful. If the Soviets utilized this throw-weight advantage in a certain fashion, if they go ahead with a very large program of MIRVing these very heavy throw-weight weapons, it is something that we have to be concerned about.

Now, it in effect means that you can place less and less dependence over the coming years, and I am talking about 10 and 15 years on one part of the triad of forces that we have.

I think inevitably the Minuteman force is going to become more vulnerable, but, as the Secretary of Defense has said, there is no way that they can get a capability to completely destroy this ICBM force and to my mind, if the Soviets could destroy a third of the force or half of the force, it would not increase their temptation to make a first strike, it would not affect the true deterrent balance, because

they always must face the fact that in addition to the ICBM's they would be subject to retaliation by the bombers and the submarine based missiles.

Senator SYMINGTON. Thank you.

ELEMENTS OF U.S. STRATEGIC FORCES TO BE MODERNIZED

My last question at this time:

You suggested in your excellent statement that we should "moderate our annual expressions of concern about Soviet ICBM's and get on with modernizing those elements of our strategic forces not threatened by ICBM."

What sort of modernization is reasonable and feasible?

Mr. SMITH. Well, I think that we are going to have to modernize the submarine force. I think that whether we do that through the full Trident program that is now projected or not is beyond the scope of my technical competence.

I am attracted by the notion of finding a less expensive platform than the Trident to put SLBM's (Submarine's Launched Ballistic Missile) on.

I am concerned about the very large number of missiles that are proposed for the Trident submarine.

On the question of the follow-on bomber, I am in favor of a follow-on bomber. I don't know that the B-1 is the answer, but I think that there is no doubt about it, the B-52's are going to need replacement. Mind you, we are talking about a time period now in the middle 1980's, and I would hope that the Air Force will use more imagination and come up perhaps with an alternative to the B-1.

I am a little bit concerned when we say we have not made a production decision on the B-1, but the Pentagon is asking for, I think, long leadtime procurement items with no alternative bomber design, and that strikes me as a good way for backing into the B-1 system. If you have no other alternative, and you are buying production items for it.

Senator SYMINGTON. We did have an alternative in the FB-11, especially with the addition of the KC-135 Tanker Fleet, but we dropped that.

DISSATISFACTION WITH B-1 BOMBER

Senator CASE. I understand the concern is about not having an alternative, but that implies that you are not satisfied with the B-1. Why aren't you satisfied with it? Is it too expensive for what you get? Is it too vulnerable for what you get? Is it worth doing?

Mr. SMITH. Senator Case, I prefaced these remarks with the statement that I don't feel I am a very good witness because the technicalities of follow-on systems are really for the hardware experts, and not the arms control experts. But my general feeling is that that, if I read the Assistant Secretary for DDR and E right, he says that the type of bomber you need depends on the evolution of the threat and the B-52 is going to be fine if the threat does not evolve beyond what it is today. But my guess is clearly the threat is not going to be static. Until one knows what it is, I don't see how one can really say this type of airframe, this type of penetrating platform, rather than a

standoff platform, is the one we need. I think the basic tension seems to be now between whether you want an airplane that could do stand-off bombing or would have to penetrate, and I don't know the answer to that.

Senator SYMINGTON. Thank you.

COMMENDATION OF MR. SMITH

Senator SYMINGTON. I want to thank you very much for coming up here this morning, and giving us your views and your experience.

Senator Case, have you any further questions?

Senator CASE. First, I want to join you, Mr. Chairman, in expressing appreciation to Mr. Smith. He is a longtime expert, and a man in whom we have great confidence.

I read your statement last night. I am glad I was able to. I have also read it again today. I want to think about it a lot more. There are other questions that will occur to me, I know, and I know that I can be free to ask you either directly or through the committee to respond.

U.S. PUBLIC'S NONACCEPTANCE OF CIVIL DEFENSE MEASURE

I am especially interested in your comments about a couple of points beyond those that the chairman has mentioned. One of them is this matter of a civil defense, and the possible movement and dispersal of population. These are pretty big steps. Isn't that right?

When you say the American people won't accept it, do you mean they won't accept it because they won't for any purpose be willing to be discommoded, or that they don't think that the necessity for such inconveniencing is there?

Mr. SMITH. Well, Senator Case, I wouldn't want to be heard to say the American people won't accept it. I am raising the question as to whether as a price for going to the new strategy, they would be willing to accept it.

For instance, you recall the great difficulty we had in the 1950's when the threat I thought seemed much worse than it does now. The great difficulty we had in getting any interest in fallout shelter programs.

Now, if just after a number of arms control agreements with the Soviets, which have reduced the threat of nuclear war, and at a time when you have something that people call deterrent, you go to the American people and say now is the time to prepare for nuclear war with greater intensity than we have in the past, I think the job of persuading the people would be very difficult.

Senator CASE. I would, too.

I constantly am required to reaccept the fact that I think the judgment of people on these rather large matters is the only final judgment on which we can rely. Whenever such a matter as this comes up, it seems to me that the best indication that it doesn't make sense is that the people aren't willing to accept it.

Would you say that that isn't a bad idea?

Mr. SMITH. Well, I have a very high respect for the American people, there is no doubt about it, but in a field as esoteric as this one, it seems

to me guidance has to come from the Congress and the executive branch, and if they feel that any new strategy is important enough that will add to the deterrent, as the Pentagon says enough to warrant this degree of regimentation of our people which will be required, then I think it is up to the Congress and the executive branch to persuade the people.

Senator CASE. I wouldn't disagree with that. But the final step, it seems to me, has to be that the public has to be given all the information we have.

I was just reading the other morning Macaulay's criticism of Bully's dialog. He was having a dialog with the shade of Thomas More, and discussing among other things, the question of whether it's better to have a people kept in ignorance and ruled by an elite. Macaulay makes a pretty good point that any prince could be equal to any one of his subjects, but that his judgment might not be as good as that of all of them. If there is anything esoteric, anything hidden, anything peculiar about this whole business that some would claim doesn't warrant our reliance on a public decision, then we ought to be alerted and recall Macaulay.

You would agree with that, wouldn't you?

Mr. SMITH. Yes, sir.

Senator CASE. You know nothing of that nature in this of which the public doesn't have a pretty good grasp?

Mr. SMITH. They certainly have access to a tremendous amount of information. Whether it is absorbed or not is another question.

CONSTANTLY TALKING ABOUT VULNERABILITY QUESTIONED

Senator CASE. I was most interested in a basic point you make that is so fundamental and that runs through our foreign and defense policy. That is the question of whether we are using unwisely and dangerously the threat of a bogey man as a means for accomplishing what to a person using that threat is obviously useful; namely, constantly talking about our vulnerability. Of course, the world is going to believe it if we keep saying it about ourselves. On the other hand, don't believe in behaving like Pollyanna. We should, of course, face facts, and I will never think that anyone ever accused you of not facing the facts. You have a certain tendency to understate, but that is purely a verbal matter. It doesn't in any way detract from your ability to see things quite clearly, and it does have the advantage that people are more likely to take your tentative suggestions as much more important than some of the bombastic pronouncements of many other people. But it is just about time that we stopped trying to scare ourselves into all kinds of strange and tortured actions, it seems to me, and I agree with you so fully about that.

CIVIL DEFENSE PROGRAM'S EFFECT ON CASUALTIES FROM LIMITED EXCHANGE

Do you think that civil defense or any program that involves a drastic dispersal of population would substantially lessen the U.S. casualties in the event of those limited nuclear exchanges that have been discussed as a contingency to be prepared for in our strategic programs?

Mr. SMITH. Well, if I understand the sort of limited exchange that is being considered in the new strategy, I would have to answer your question "Yes."

I think if we had a nationwide fallout shelter program that was efficient and we had evacuation programs from our cities that had been exercised in advance, let us say, in peacetime, and people were sufficiently disciplined to stream out of the cities in some sort of orderly fashion, I would think yes, that would reduce the casualties from the sort of limited strategic nuclear exchange.

Senator CASE. You can see models in which this would be useful?

Mr. SMITH. Yes, sir. I don't want to be understood from that answer, however, as saying I favor the type of strategy that would require this.

PUBLIC ACCEPTANCE OF CIVIL DEFENSE PROGRAM

Senator CASE. I should have posed my question in terms to permit you to give the answer that you have just given, and beyond that take it you have already answered the question as to whether the public would accept any such program or the necessity for it?

Mr. SMITH. I think not unless much greater sense of alarm was generated than I think the circumstances warrant.

Senator CASE. Therefore, you are not like Senator Vandenberg when he spoke to President Truman. You are not going to recommend that the public be scared to death.

Mr. SMITH. No.

Senator CASE. Thank you very much.

POSSIBLE ELIMINATIONS FROM MILITARY BUDGET

Senator SYMINGTON. I would like to say one thing before calling on Senator Javits.

In my own opinion, and I have had some experience in this field the present budget as submitted to the Congress by the Pentagon is an excellent illustration of the statement that the military are prone to follow tradition against modernity, especially if they won the previous war.

With that premise, I would ask that you take your time, and supply us for the record what you believe personally. I have talked to you many times on the subject, and visited with you several times in Vienna. I ask that you submit a paper as to what you think we could eliminate, and at the same time still maintain all of the deterrence possible in a world where there is no question about the capacity of one power to destroy us, and there is no question about our capacity in turn to destroy them.

It seems that we are going along the old track of defense and structure and functioning, and if you have any thoughts along those lines we would appreciate your giving us the benefit of your vast experience in this field.

Mr. SMITH. I would be glad to do it, sir.

Senator SYMINGTON. Senator Javits.

Senator JAVITS. Thank you very much.

SOVIET ATTITUDE TOWARD NUCLEAR ARMS LIMITATION

Mr. Smith, I just have one line of questioning in mind. I gather it has not been covered as yet. That is, your assessment of the attitude of the Soviet Union, and what would contribute to that attitude.

Do you, for example, see that recent events in Vietnam and Cambodia and Portugal and Greece and Turkey and the Middle East have had any effect on the Soviet Union's interest in further nuclear arms limitation?

Mr. SMITH. I would think not, Senator Javits. It seems to me that the Soviets have to some extent, or to a large extent, compartmented their interest in strategic arms control from other parts of their foreign policy.

I can recall how struck I was, for instance, during the SALT negotiations when we saw things like the Cambodian incursion and the bombing of Haiphong, how no waves were caused at all in the negotiation about strategic arms. I expected that both of those incidents would have at least caused psychological trauma in the negotiations. They did not.

If I understand the rhetoric coming out of Moscow right, that seems to be their present policy.

Now, I am bound to say that I don't think it helps our bargaining power or our psychological position to be in the position we are in now around the world, but I don't think that should affect the outcome of the negotiations to implement the Vladivostok agreement.

SOVIET OBJECTIVE IN VLADIVOSTOK NEGOTIATIONS

Senator JAVITS. Along the same line, do you feel the Soviet objective in these negotiations is, for example, to limit the expenditure of money or to limit their risk of nuclear war, or to impress the third world with their peaceful desires or any other basic philosophic concept which has higher priority than some others, as you detect it in your negotiations?

Mr. SMITH. Well, I would think, Senator Javits, that the Soviet motivation, like ours, is multiple. I didn't detect any specific primary motivation. I think that they would like to reduce the burden on their treasury of continuously competing with the United States. I think there is a feeling on their part that in a technological competition they are not going to win, because I think they recognize that our capabilities and the way we are organized to convert our science and technology into hardware in this field is better than theirs. I think that they do realize, perhaps more than we do, the importance of the opinion around the world as to whether the superpowers are doing enough to negotiate arms control agreement. I think we will get a taste of this at the Non-Proliferation Treaty Review Conference that is coming up this spring. One of the points is going to be, are the superpowers fulfilling their commitments under article VI of that treaty to reach disarmament agreements?

I think the Soviets are psychologically more sensitive to the importance of this sort of thing than we are.

I don't think that I could put my finger on one component of that, I think it is a mixture of all of them, and in addition, as you point out, they are concerned about the risk of nuclear war.

I think that having been through a tremendous devastation of their own country, they know what this would mean to them. They were quite interested in 1971 in reaching agreements to try to control the risk of accidental nuclear war, to upgrade the "Hotline," which struck me as evidence of serious interest in this whole question of the risk of unwanted, miscalculated accidental nuclear war.

Senator JAVITS. I think this is very informative and very useful. If you feel that you could, after thoughtful consideration, supplement this answer—you see what we are reaching for—I would greatly appreciate it if you would, as you did in response to Senator Symington's question, let us have whatever your thoughts are in depth on this subject.

Mr. SMITH. I would be glad to.

RATIFICATION OF 1974 PROTOCOL TO ABM TREATY

Senator JAVITS. Finally, you indicate what is undoubtedly true, that the Vladivostok communique is not an agreement that would have to be incorporated into any finite form and approved by the Senate and ratified.

Now, do you have any feeling about a threshold step to Senate ratification of the 1974 protocol to the 1972 ABM Treaty as a desirable rule in setting the climate for Geneva?

Mr. SMITH. Well, I am not a constitutional lawyer, but I had assumed an amendment to a treaty which had been ratified by the Senate would also have to be ratified by the Senate. The timing of that, I think it would be helpful to have that as soon as possible.

Senator JAVITS. Thank you very much.

Thank you, Mr. Chairman.

Senator SYMINGTON. Thank you.

Thank you, Mr. Ambassador.

We are going to hear from Dr. Doty, and Dr. Panofsky.

Perhaps, gentlemen, you could come up together, if you would.

We welcome you both.

Dr. Panofsky, do you have a statement?

[Dr. Panofsky's biography follows:]

BIOGRAPHICAL SKETCH OF W. K. H. PANOFSKY, DIRECTOR, STANFORD LINEAR ACCELERATOR CENTER

Degrees

1938: A.B. Princeton University.

1942: Ph.D., California Institute of Technology.

1963: D.Sc. (Hon.), Case Institute of Technology.

1964: D.Sc. (Hon.), University of Saskatchewan, Canada.

Experience

1942-3: Director, Office of Scientific Research & Development Project, California Institute of Technology, Pasadena.

1943-5: Consultant, Manhattan District, Los Alamos, New Mexico.

1945-6: Physicist, Radiation Laboratory, University of California at Berkeley.

1946-8: Assistant Professor of Physics, University of California at Berkeley.

1948-51: Associate Professor of Physics, University of California at Berkeley.

1951-63: Professor of Physics, Stanford University.

1953-61: Director, Professor, Stanford High Energy Physics Laboratory.

1961-: Director, Professor, Stanford Linear Accelerator Center, Stanford University.

Special Fields

X-rays and natural constants; accelerator design; nuclear research; high-energy physics.

Activities

- 1945-60: Division of Military Application, U.S. Atomic Energy Commission.
 1954-58: Member, Physics Panel, National Science Foundation.
 1955-57: U.S. Air Force Scientific Advisory Board.
 1951: Consultant, Radiation Laboratory, University of California, Berkeley.
 1958: Consultant, Stanford Research Institute, Menlo Park, California.
 1960-64: President's Science Advisory Committee.
 1959: Office of Director of Defense Research and Engineering (member, Ad Hoc Group on Detection of Nuclear Explosions).
 1959: WAE Foreign Service Office, Department of State: Chairman, U.S. Delegation (Geneva), Technical Working Group on High Altitude Detection; Vice-Chairman, U.S. Delegation (Geneva), Technical Working Group 2.
 1958-60: Member, High Energy Commission of International Union of Pure and Applied Physics.
 1958-60: Review Committee for the Particle Accelerator Division and High Energy Physics Division, Argonne National Laboratory.
 1959-61: Advisory Council, Department of Physics, Princeton University.
 1958-62: Advanced Research Projects Agency, Consultant.
 1963-66: Physics Survey Committee, National Academy of Sciences.
 1964: Advisory Committee, 200-BeV Accelerator Study, Lawrence Radiation Laboratory, Berkeley.
 1965-73: Consultant, Office of Science and Technology, Executive Office of the President.
 1965-73: Steering Committee, JASON Division, Institute for Defense Analyses.
 1959- : Consultant, Arms Control & Disarmament Agency.
 1967-70: Member, High Energy Physics Advisory Panel to the Atomic Energy Commission.
 1968-72: Advisory Committee, Brookhaven National Laboratory.
 1968-71: Advisory Committee, Cambridge Electron Accelerator Laboratory.
 1968-71: Advisory Committee, Physics Department, University of Rochester.
 1969-71: Advisory Committee, Physics Mathematics & Astronomy Depts., California Institute of Technology.
 1969-70: Co-Chairman, Stanford Mid-Peninsula Urban Coalition.
 1973- : Board of Directors, Annual Reviews, Inc.

Societies

Phi Beta Kappa; American Physical Society (Fellow and 1974 President); Sigma Xi; National Academy of Sciences; American Academy of Arts and Sciences, Council on Foreign Relations.

Awards

Guggenheim Fellowships (1959 and 1973); Ernest Orland Lawrence Memorial Award (1961); Richtmyer Lecture (1963); California Institute of Technology—Alumni Distinguished Service Award (1966); California Scientist of the year Award (1967); National Medal of Science (1969); Franklin Institute Award (1970); Annual Public Service Award, Federation of Amer. Scientists—1973.

Publications

Classical Electricity and Magnetism (with M. Phillips), Cambridge, Addison-Wesley (1955); 2nd edition (1962); numerous scientific papers in professional journals.

Personal Data

Name: Wolfgang Kurt Hermann Panofsky, born April 24, 1919, Berlin Germany, entered U.S. September 1934, naturalized April 1942, married (Adele Irene DuMond), children: Richard Jacob, October 13, 1943, Margaret Anne, October 13, 1943, Edward Frank, April 19, 1947, Carol Eleanor, January 12, 1951, Steven Thomas, December 13, 1952.

Home address: 25671 Chapin Ave., Los Altos Hills, Calif. 94022.

Office address: SLAC, P.O. Box 4349, Stanford, Calif. 94305.

STATEMENT OF WOLFGANG K. H. PANOFSKY, DIRECTOR, STANFORD LINEAR ACCELERATOR CENTER, STANFORD UNIVERSITY

Mr. PANOFSKY. Yes, sir, I have a prepared statement, which I have submitted.

Time being short, I will try to omit some of the passages, but with your permission, I would like to read it.

Senator SYMINGTON. I wish you would read anything that you think would help us in this all-important subject.

Mr. PANOFSKY. Thank you very much.

I am pleased to have the opportunity again to offer my views on the agreement signed by President Ford and Secretary Brezhnev in Vladivostok late last year.

IMPOSSIBILITY OF ASSESSING VLADIVOSTOK AGREEMENT'S MERIT
IN ISOLATION

It is impossible for anyone to assess the merit of the Vladivostok Agreement as an isolated event for the following reasons:

(1) The agreement is by no means a treaty in itself; rather, it is an accord between the two leaders as to the broad outline to govern the instructions they will give to their respective delegates at SALT. There are many highly substantive issues which will have to be settled to bridge the gap between the rudimentary Vladivostok outline and a final treaty.

(2) The effect of the Vladivostok Agreement and the corresponding SALT II treaty on future strategic development programs, deployment, and military budgets is dependent on concomitant policies and the conduct of military-strategic affairs by the two nations, as well as general world conditions.

(3) The effect of the Vladivostok Agreement and the proposed treaty is limited in time, both by its explicit provisions, the treaty to be negotiated will cover a 10-year timespan only, and also by the limited nature of the agreement. Strategic technological developments permitted under the Vladivostok Agreement could render any arms control impact of the accords obsolete within the next generations of military systems.

For these reasons it is impossible to assess the merits and defects of the Vladivostok Agreement without, at the same time, making assumptions as to concurrent and future events. It is here that the Congress has a great deal of power in shaping these events and in thereby assuring that the benefits stemming from Vladivostok Agreement will outweigh its risks. I would like to direct my testimony to the identification of both constructive opportunities and of dangers inherent in the nature of the agreement.

REASON BEHIND HIGH NUMERICAL LIMITS

It is well known that the Vladivostok Agreement establishes exceedingly high numerical limits to strategic arms. What is less well understood is the reason behind these large numbers.

Public Law 92-448 requires that a SALT Agreement achieve equality between the United States and the U.S.S.R. in the totality of central strategic systems, that is, ICBM's, SLBM's and strategic bombers.

Thus in the face of this mandated symmetry it is very difficult to recognize the de facto existing asymmetry in terms of the actually existing armaments and the geographic conditions of the two powers. It has frequently been pointed out that the United States now has a commanding technological lead in terms of the number of MIRV'd warheads and vehicle accuracy. On the other hand; it is also correct that once the Soviets reach in the future what is now current U.S. technological capability, then their higher missile throw-weight would permit them to fit their vehicles with a large number of MIRV's of presumably matching accuracy but higher explosive power relative to present U.S. performance. Conversely, the Vladivostok Agreement does not prevent the United States from increasing the throw-weight of U.S. missiles by a very large factor.

There is one further asymmetry: The United States has only about 25 percent of its deterrent power, either in terms of warheads or megatonnage, in its land-based ICBM's, while the Soviet Union carries roughly 70 percent of its intercontinental destructive power in land-based missiles. Therefore the Soviet Union has much greater reason than does the United States to be concerned should a technically credible counterforce threat against ICBM silos emerge in the future.

This complex situation—a statutory requirement for equality in the face of many actual inequalities combined with time pressure for real agreement in the absence of extensive preparation is a difficult base for meaningful arms control. Yet by focusing on such high numbers it was possible for both parties to make substantial concessions which swept away obstacles which had prevented agreement on offensive strategic weapons for the 1972 SALT I treaty. Specifically, the Soviet Union agreed to ignore the U.S. forward-base aircraft in Western Europe which has a capability of delivering appreciable megatonnage to the eastern Soviet Union. The Soviets also agreed to ignore the commanding lead the United States possesses in terms of its seabased, highly MIRV'd deployment and the geographic asymmetry in regard to access to ocean areas. Conversely, the United States agreed not to seek compensation for the approximately 300 modern large ballistic missiles (MLBM's) now in the Soviet inventory which can deliver considerably larger total throw-weight onto U.S. territory.

It is well known that a number as large as 2,400 for the number of delivery vehicles is vastly in excess of that needed for delivering an unacceptable retaliatory blow against an opponent who would attack this Nation. Even the staunchest defenders, on either the United States or U.S.S.R. side, of the actual weapons systems now in being or planned would find themselves hard-pressed to identify an even remotely believable use for all these forces in case of war.

QUESTION OF SURVIVABILITY OF LAND-BASED DETERRENT

The number of MIRV'd warheads is so large that the question of the survivability of the land-based deterrent under enemy ICBM attack is totally insensitive to the actual number. The question which you ask, and which Mr. Smith eloquently discussed about the uncertainty of the survivability of ICBM's of the Minuteman force is really insensitive as to how large this number actually is. Once the number

of MIRV'd ICBM launchers is above the 300-400 value, then the vulnerability of the land-based deterrent becomes almost entirely a question of the accuracy of the opponent's delivery vehicles. Larger numbers of MIRV'd ICBM's are of little use because a large number of simultaneously attacking RV's against a single silo cannot be used without the attackers killing one another through various fratricide effects. Thus the agreed number of MIRV'd launchers bears no relationship to the problem of survival of the land-based deterrent, nor to penetration of the opponent's ABM defenses—SALT I has effectively eliminated attrition of our deterrent from that source. The 1,320 number corresponds to the United States' current inventory of about 900 MIRV'd launchers, combined with the planned U.S. additions, including Trident.

DEFENSE AGAINST EMERGING NUCLEAR POWERS

There is no justification for the large numbers either of total aggregate delivery systems or MIRV'd launchers as a needed defense against emerging nuclear powers. The United States and U.S.S.R. remain vastly overarmed offensively relative to other countries, even if these numbers were greatly reduced. Thus the numbers as agreed are indeed excessively high for any reasonable military requirement, and one has to look at internal and external political realities rather than strategic necessity as the rationale for these figures. These large numbers constituted an umbrella under which the other sources of disagreement were compromised and eliminated.

SAFE OPPORTUNITY FOR SLOWDOWN OFFERED BY VLADIVOSTOK

While the Vladivostok agreement is clearly not in itself meaningful arms control, in that it does not impede currently planned weapons on either side, it could be an important factor in the future, provided both nations have the will to restrain their armaments. The existence of a numerical ceiling on deployed weapons limits the worst case intelligence projections which both countries use internally in planning their strategic needs. Therefore, the very existence of the Vladivostok accords should now imply a slowdown if not a leveling off of strategic forces. The urgency for rapid new force deployments, modernizations, or replacements should be lessened. Thus, in the face of the Vladivostok agreements the Congress should consider, with skepticism, the claimed basis for many of the requested authorizations for new research and development initiatives on new strategic systems as well as accelerated deployment plans. Vladivostok offers a safe opportunity for a slowdown, if not a reversal, of the United States and the U.S.S.R. strategic arms race; the question is only, will that opportunity be granted?

EARLIER AGREEMENTS COULD HAVE PROVIDED BASIS FOR RESTRAINT

I would like to emphasize that earlier agreements, in particular the SALT I treaty, could have provided a basis for restraint in the deployment of military systems. The SALT I treaty, as supplemented by the 1974 Summit Agreement, protocol permits only one ABM site in the United States and the Soviet Union. This assured the penetra-

tion of all but a very small number of reentry vehicles launched by either side onto enemy soil. Thus the very existence of the SALT I ABM agreement enhanced the deterrent value of each missile in our arsenal, and therefore, both sides could have attained the same deterrent power with fewer missiles. Yet I am not aware of a single statement by a Secretary of Defense identifying this fact. Rather, other arguments were advanced, based on notions of perceived, or conjectured, future inferiority, which establish requirements for new strategic systems, even though the power of the old ones was greatly enhanced by the very existence of the SALT I treaty. The failure of either side to capitalize on the opportunities for reduced strategic armament offered by SALT I is an experience from which we should learn not to make the same mistake again with regard to the Vladivostok accords.

PERCEIVED POLITICAL AND BARGAINING SIGNIFICANCE OF NUMBERS AND WEIGHTS

One of the undesirable byproducts of recent arms control negotiations has been to elevate the numbers of missiles, or numbers of reentry vehicles, or tons of throw-weight, to items of perceived political and bargaining significance, even if such numbers and weights are militarily unusable. In Secretary Schlesinger's words given in the "Annual Defense Department Report, Fiscal Year 1976":

*** equality is also important for symbolic purposes, in large part because the strategic offensive forces have come to be seen by many—however regrettably—as important to the status and stature of a major power.

Some political leaders tend to lose awareness of the awesome physical realities behind these numbers of weapons of mass destruction, and instead measure inferiority or superiority by raw numbers. An urgent task for this Congress is to deflate the political significance of such detailed numerical ceilings.

"Equality" of strategic forces tends to be in the eye of the beholder. Not surprisingly, military leaders of both the United States and the U.S.S.R. tend to emphasize publicly those selected areas where they believe their forces to be inferior or at least threatened to become inferior in the future. Therefore, "equality," unilaterally interpreted, provides little restraint to military developments.

There is universal agreement that both the Soviet Union and the United States possesses a broadly secure second-strike posture. Only a small fraction of the strategic force of each side can be destroyed by a first strike of the other. Any reasonable analyst fully realizes that once a substantial number of nuclear weapons has been used, the total number of weapons is so incredibly large that the future course and eventual outcome of an engagement is all but unpredictable. Even the physical and biological effects of nuclear war may well hold new surprises.

SAFE OPPORTUNITY FOR UNILATERAL RESTRAINT

Under these circumstances the Vladivostok ceilings provide an opportunity for unilateral restraint to be exercised with safety. In contrast, the interpretation of a policy of "flexible response," which requires us to match in some detail any perceived Soviet threat in

kind, is a prescription for escalation. I quote from the fiscal year 1975 report of the Secretary:

We do not propose to let an opponent threaten a major component of our forces without our being able to pose a comparable threat.

This is the kind of escalatory philosophy that Ambassador Smith referred to.

Let me be clear: I am in no way maintaining that the Soviets have shown demonstrable restraint in either development or deployment of new strategic systems—they have not, and we do not know whether they are acting in response to earlier U.S. moves, or out of institutional inertia, or to gain political leverage, or from a combination of these factors. All I am maintaining is that the Vladivostok Agreement, combined with the prevailing strategic situation, gives both sides a safe opportunity for unilateral restraint without demanding immediate reciprocity.

CHANGED REALITIES OF WARFARE

The power of nuclear weapons has drastically changed the realities of warfare. Irrespective of the intricacies of strategic doctrine which each side may proclaim, the fact remains that the population of each country is in a very real sense a hostage—a large fraction of the people of each side can be destroyed by events set in motion, intentionally or unintentionally by national leaders.

As a member of the academic community, I am proud to be one of the targets of the charge that Secretary Schlesinger made in his "Annual Defense Department Report for Fiscal Year 1976:

The "fifties," if nothing else, were a period during which many institutions became excessively intrigued with the novelty of nuclear explosions. There is some evidence that the academic community has not recovered from the novelty yet.

Indeed, I have not recovered from the novelty of the experience in 1945 as an observer flying in a B-29 above the Trinity explosion—the first nuclear detonation. I consider it to be a continuing responsibility of members of the technical community to remind political leaders about the physical, biological, and environmental realities of nuclear weapons.

CRITICAL ISSUES TO BE RESOLVED

The Vladivostok accords commit each side to instruct their SALT delegations along agreed broad guidelines. However, many critical issues have to be resolved before a SALT II Treaty can be signed, and specific agreements implementing the Vladivostok Agreement may be difficult to reach. Let me identify some of the outstanding issues. In my prepared statement I have listed some of the very difficult issues, and time being short I would only read them here by title.

One is how does one count strategic bombers? This is a complex question.

How do you verify the number of MIRV'd launchers. Again, this is a very difficult question involving many technical components.

EFFECT OF DEVELOPING NEW SYSTEMS ON VLADIVOSTOK AGREEMENT'S
SIGNIFICANCE

I would like to talk further on the impact of new systems under development on the significance of the Vladivostok Agreement. I have identified in my statement research and development items in the administration's fiscal year 1976 budget, some of which could well negate the opportunity of the Vladivostok Agreement.

Similarly, the Soviets have many new weapons systems under development. For instance, the sea-launched cruise missile, once developed would add a large number of additional long-range delivery vehicles to the inventories which are very difficult to verify. The range of a cruise missile is difficult to identify from its external appearance, and the launchers can, in fact, be very similar to those of conventional torpedo tubes.

Then the problem of mobile ICBM's, to which Mr. Smith addressed himself, could similarly frustrate any numerical ceiling on agreed future limitation on land-based ICBM's.

As Ambassador Smith mentioned, mobile ICBM's are of greater use to the Soviets than to the United States. And he also mentioned that the U.S. delegation made a unilateral declaration stating that we would consider the deployment of mobile ICBM's a violation of the 1972 interim agreement. Again, depending on the detailed basing pattern and the system of mobile ICBM's, it would be difficult to verify the number of mobile launchers.

CAN VLADIVOSTOK AGREEMENT BECOME CONSTRUCTIVE MOVE?

Now, let me talk to my last subject, Can the Vladivostok Agreement become a constructive move?

The above discussion indicates that the SALT negotiators will be hard-pressed to convert the Vladivostok Agreements into a viable SALT II treaty by the time of the Brezhnev visit. It is probably not feasible to consider negotiating any but the minimum constraints beyond the Vladivostok guidelines into such a treaty, particularly in view of the deterioration of Soviet-United States relations since the Ford-Brezhnev meeting.

I share the sentiment of many Members of Congress in wishing that a more restrictive arms control agreement had been reached at Vladivostok. However, amending the Vladivostok guidelines now during negotiations through congressional directive for a more restrictive agreement, is ill-advised; such a move would undermine prospects for an agreed treaty and would tend to undermine the ability of the executive branch in negotiating future arms control agreements. Rather, I recommend to the Congress that it (a) exercise its power, primarily through its budgetary authority, in assuring that the new opportunities for a slow-down in strategic weapons initiation which the Vladivostok Agreements have provided will indeed be reduced to practice, and that the danger of having the agreements lead to an actual escalation of strategic arms be avoided; (b) press for negotiation of a speedy follow-on treaty of greater restraining power—both through quantitative reductions and qualitative brakes on the evolution of new systems.

A SALT II treaty based on the Vladivostok guidelines should only be another step in a series of further restraining agreements. Thus the Congress should share the responsibility for preventing the ongoing series of SALT negotiations from just deflecting the arms race, rather than averting it; moreover, the SALT negotiations should not be used as a lever for actually accelerating military development and even deployment.

Let me summarize; the Vladivostok accords can become a turning point toward truly effective arms control leading to a saner level of strategic armaments if the Congress takes initiatives to:

Deflate the oratory which gives unmerited significance to specific numbers of nuclear weapon delivery systems

Reject the "bargaining chip" approach as a basis for increasing strategic expenditures by disapproving authorization of development and deployment of new strategic systems which are not needed for justifiable military missions

Exercise restraint on authorizing new development and deployments, considering the limits the Vladivostok agreements place on the evolution of the long-range threat.

Press for speedy follow-on negotiations subsequent to a SALT II treaty along the Vladivostok guidelines, to achieve reductions of weapons below the Vladivostok ceilings and qualitative constraints to slow down the technological arms race.

If, and only if, these additional initiatives are successful, will the Vladivostok agreements enter into history as a decisive move reversing the "race to oblivion."

Thank you, Mr. Chairman.

[Mr. Panofsky's prepared statement follows:]

PREPARED STATEMENT OF W. K. H. PANOFSKY, THE VLADIVOSTOK
AGREEMENT—BENEFITS AND RISKS

I am pleased to have the opportunity again to offer my views on the agreement signed by President Ford and Secretary Brezhnev in Vladivostok late last year. I am testifying here as an individual citizen who has a long-standing interest in the control of arms to increase the real security of the country and the world.

I. INTRODUCTION

It is impossible for anyone to assess the merit of the Vladivostok Agreement as an isolated event for the following reasons:

(1) The agreement is by no means a treaty in itself; rather, it is an accord between the two leaders as to the broad outline to govern the instructions they will give to their respective delegates at SALT. There are many highly substantive issues which will have to be settled to bridge the gap between the rudimentary Vladivostok outline and a final treaty.

(2) The effect of the Vladivostok Agreement and the corresponding SALT II treaty on future strategic development programs, deployment, and military budgets is dependent on concomitant policies and the conduct of military-strategic affairs by the two nations, as well as general world conditions.

(3) The effect of the Vladivostok Agreement and the proposed treaty is limited in time, both by its explicit provisions (the treaty to be negotiated will cover a 10-year time span only) and also by the limited nature of the agreement. Strategic technological developments permitted under the Vladivostok Agreement could render any arms control impact of the accords obsolete within the next generations of military systems.

For these reasons it is impossible to assess the merits and defects of the Vladivostok Agreement without at the same time making assumptions as to concurrent and future events. It is here that the Congress has a great deal of power in shaping these events and in thereby assuring that the benefits stemming

from the Vladivostok Agreement will outweigh its risks. I would like to direct my testimony to the identification of both constructive opportunities and of dangers inherent in the nature of the agreement.

II. THE VLADIVOSTOK AGREEMENT—IS IT ARMS CONTROL?

1. *The Numbers*

It is well known that the Vladivostok Agreement establishes exceedingly high numerical limits to strategic arms: 2,400 aggregate strategic delivery vehicles and a limit of 1,320 of MIRV'd missiles are permitted. What is less well understood is the reason behind these large numbers.

Public Law 92-448 requires that a SALT agreement achieve equality between the U.S. and the U.S.S.R. in the totality of central strategic systems (i.e., ICBM's, SLBM's and strategic bombers). Thus in the face of this mandated symmetry it is very difficult to recognize the de facto existing asymmetry in terms of the actually existing armaments and the geographic conditions of the two powers. It has frequently been pointed out that the U.S. now has a commanding technological lead in terms of the number of MIRV'd warheads and vehicle accuracy. On the other hand, it is also correct that once the Soviets reach in the future what is now current U.S. technological capability, then their higher missile throw-weight would permit them to fit their vehicles with a large number of MIRV's of presumably matching accuracy but higher explosive power relative to present U.S. performance. Conversely, the Vladivostok Agreement does not prevent the U.S. from increasing the throw-weight of U.S. missiles by a large factor.

There is one further asymmetry: The United States has only about 25% of its deterrent power (either in terms of warheads or megatonnage) in its land-based ICBM's, while the Soviet Union carries roughly 70% of its inter-continental destructive power in their land-based missiles. Therefore the Soviet Union has much greater reason than does the U.S. to be concerned should a technically credible counterforce threat against the ICBM silos emerge in the future.

This complex situation—a statutory requirement for equality in the face of many actual inequalities combined with time pressure for real agreement in the absence of extensive preparation—is a difficult base for meaningful arms control. Yet by focusing on such high numbers it was possible for both parties to make substantial concessions which swept away obstacles which had prevented agreement on offensive strategic weapons for the 1972 SALT I treaty. Specifically, the Soviet Union agreed to ignore the U.S. forward-based aircraft in Western Europe which has a capability of delivering appreciable megatonnage to the eastern Soviet Union. The Soviets also agreed to ignore the commanding lead the United States possesses in terms of its sea-based, highly MIRV'd deployment and the geographic asymmetry in regard to access to ocean areas. Conversely, the United States agreed not to seek compensation for the approximately 300 Modern Large Ballistic Missiles (MLBM's) now in the Soviet inventory which can deliver considerably larger total throw-weight onto U.S. territory.

2. *The Aggregates of Central Systems*

As far as the permitted total aggregate of strategic delivery vehicles is concerned, the value arrived at represents a figure at which a small reduction of Soviet forces will be necessary, but which provides no constraint on the planned build-up of U.S. forces. It is well known that a number as large as 2,400 for the number of delivery vehicles is vastly in excess of that needed for delivering an unacceptable retaliatory blow against an opponent who would attack this nation. Even the staunchest defenders, on either the U.S. or U.S.S.R. side, of the actual weapons systems now in being or planned would find themselves hard-pressed to identify an even remotely believable use for all these forces in case of war.

3. *The MIRV Sub-Limit*

The number of MIRV'd warheads is so large that the question of the survivability of the land-based deterrent under enemy ICBM attack is totally insensitive to the actual number. Once the actual number of MIRV'd ICBM launchers is above the 300-400 value, then the vulnerability of the land-based deterrent becomes almost entirely a question of the accuracy of the opponent's delivery vehicles. Larger numbers of MIRV'd ICBM's are of little use because a large number of simultaneously attacking RV's against a single silo cannot be used without the attackers killing one another through various "fratricide" effects. Thus the agreed number of MIRV'd launchers bears no relationship to the prob-

lem of survival of the land-based deterrent, nor to penetration of the opponent ABM defenses—SALT I has effectively eliminated attrition of our deterrent from that source. The 1,320 number corresponds to the U.S. current inventory of about 900 MIRV's, combined with the planned U.S. additions, including Trident.

4. Summary

There is no justification for the large numbers either of total aggregate deliver, systems or MIRV'd launchers needed to defend against emerging nuclear powers. The U.S. and U.S.S.R. remain vastly overarmed offensively relative to other countries, even if these numbers were greatly reduced. Thus the high number as agreed are indeed excessively high for any reasonable military requirement and one has to look at internal and external political realities rather than strategic necessity as the rationale for their value: These large numbers constituted an umbrella under which the other sources of disagreement were compromised and eliminated.

III. THE VLADIVOSTOK AGREEMENT—DOES IT PERMIT OR ENCOURAGE RESTRAINT?

1. *The Vladivostok Agreement as a Ceiling on Intelligence Projections*

While the Vladivostok Agreement is clearly not in itself meaningful arms control, in that it does not impede currently planned weapons on either side, it could be an important factor in the future, provided both nations have the will to restrain their armaments. The existence of a numerical ceiling on deployed weapons limits the "worse case" intelligence projections which both countries use internally in planning their strategic needs. Therefore the very existence of the Vladivostok accords should now imply a slow-down if not a leveling off of strategic forces. The urgency for rapid new force deployments, modernizations, or replacements should be lessened. Thus in the face of the Vladivostok agreements the Congress should consider with skepticism the claimed basis for many of the requested authorizations for new research and development initiatives on new strategic systems as well as accelerated deployment plans. Vladivostok offers a safe opportunity for a slow-down, if not a reversal, of the U.S. and the USSR strategic arms race; the question is only—will that opportunity be grasped?

I would like to emphasize that earlier agreements, in particular the SALT I treaty, could have provided a basis for restraint in the deployment of military systems. The SALT I treaty, as supplemented by the 1974 Summit Agreement, permits only one ABM site in the U.S. and the Soviet Union. This assured the penetration of all but a very small number of reentry vehicles launched by either side onto enemy soil. Thus the very existence of the SALT I ABM agreement enhanced the deterrent value of each missile in our arsenal, and therefore both sides could have attained the same deterrent power with fewer missiles. Yet I am not aware of a single statement by a Secretary of Defense identifying this fact. Rather, other arguments were advanced, based on notions of perceived, or conjectured, future inferiority, which establish requirements for new strategic systems, even though the power of the old ones was greatly enhanced by the very existence of the SALT I treaty. The failure of either side to capitalize on the opportunities for reduced strategic armament offered by SALT I is an experience from which we should learn not to make the same mistake again with regard to the Vladivostok accords.

2. *Numbers of Nuclear Weapons versus Physical Reality*

One of the undesirable by-products of recent arms control negotiations has been to elevate the numbers of missiles, or numbers of reentry vehicles, or tons of throw-weight, to items of perceived political and bargaining significance, even if such numbers and weights are militarily unusable. In Secretary Schlesinger's words:¹ ". . . equality is also important for symbolic purposes, in large part because the strategic offensive forces have come to be seen by many—however regrettably—as important to the status and stature of a major power." Some political leaders tend to lose awareness of the awesome physical realities behind these numbers of weapons of mass destruction, and instead measure inferiority or superiority by raw numbers. An urgent task for this Congress is to deflate the political significance of such detailed numerical ceilings. A disservice is being done by meaningless debate as to "who is ahead" and "who is behind" within the framework of the Vladivostok Agreement.

¹ Annual Defense Department Report, fiscal year 1976.

"Equality" of strategic forces tends to be in the eye of the beholder. Not surprisingly, military leaders of both the U.S. and the USSR tend to emphasize publicly those selected areas where they believe their forces to be inferior or at least threatened to become inferior in the future. Therefore "equality," unilaterally interpreted, provides little restraint to military developments.

There is universal agreement that both the Soviet Union and the United States possess a broadly secure second-strike posture: Only a small fraction of the strategic force of each side can be destroyed by a first strike of the other. Any reasonable analyst fully realizes that once a substantial number of nuclear weapons has been used, the total number of weapons is so incredibly large that the future course and eventual outcome of an engagement is all but unpredictable and that the very survival of each warring nation would be in grave doubt. Even the physical and biological effects of nuclear war may well hold new surprises.

Under these circumstances the Vladivostok ceilings provide an opportunity for unilateral restraint to be exercised with safety. In contrast, the interpretation of a policy of "flexible response," which requires us to match in some detail any perceived Soviet threat in kind,² is a prescription for escalation.

Let me be clear: I am in no way maintaining that the Soviets have shown demonstrable restraint in either development or deployment of new strategic systems—they have not, and we do not know whether they are acting in response to earlier U.S. moves, or out of institutional inertia, or to gain political leverage, or from a combination of these factors. All I am maintaining is that the Vladivostok Agreement, combined with the prevailing strategic situation, give both sides a safe opportunity for unilateral restraint without demanding immediate reciprocity.

The power of nuclear weapons has drastically changed the realities of warfare. Irrespective of the intricacies of strategic doctrine which each side may proclaim, the fact remains that the population of each country is in a very real sense a hostage—a large fraction of the people of each side can be destroyed by events set in motion by national leaders.

As a member of the academic community I am proud to be one of the targets of the charge that Secretary Schlesinger made in his Annual Defense Department Report for FY 1976: "The 'Fifties,' if nothing else, were a period during which many institutions became excessively intrigued with the novelty of nuclear explosions. There is some evidence that the academic community has not recovered from the novelty yet."

Indeed, I have not recovered from the novelty of the experience in 1945 as an observer flying in a B-29 above the Trinity explosion—the first nuclear detonation. I consider it to be a continuing responsibility of members of the technical community to remind political leaders about the physical, biological and environmental realities of nuclear weapons.

IV. THE GAP BETWEEN THE VLADIVOSTOK AGREEMENT AND A TREATY LIMITING OFFENSIVE STRATEGIC WEAPONS

The Vladivostok accords commit each side to instruct their SALT delegations along agreed broad guidelines. However, many critical issues have to be resolved before a SALT II treaty can be signed, and specific agreements implementing the Vladivostok Agreement may be difficult to reach. Let me identify some of the outstanding issues.

1. *How are Strategic Bombers Counted?*

The precise definition of a strategic bomber to be counted as a single unit in the permitted aggregate of 2400 is a difficult problem. We first have the question of the medium-range bombers. Recently the Soviets have deployed what is generally known as the Backfire in numbers which are significant, but still minor, in the context of the existing strategic vehicles. This airplane can acquire substantial strategic value if it either carries long-range stand-off missiles, or if backed up by an aerial refueling tanker fleet, neither of which is now available.

A single aircraft counts as one in the aggregate of strategic delivery vehicles permitted under the Vladivostok agreements. However, if an aircraft becomes the launch platform for numerous missiles of intercontinental range, then it might well have to be counted in terms of the number of launchers it carries. Which way of counting is appropriate depends on the range of the missiles carried, a number not generally easy to verify.

² "We do not propose to let an opponent threaten a major component of our forces without our being able to pose a comparable threat." Annual Defense Department Report, fiscal year 1975.

2. Verification of the Numbers of MIRV'd Launchers

On the U.S. side 550 launchers of the Minuteman force consist of Minuteman III MIRV'd missiles, while the balance of the Minuteman force is non-MIRV'd. However, the U.S. missile launch silos for the MIRV and non-MIRV'd version are essentially identical, and ground-support equipment can be very similar. On the Soviet side we can distinguish MIRV'd vs. non-MIRV'd missiles by observations taken from their flight tests. The conservative assumption would be that any silo fitting a missile which has been flight tested in a MIRV'd mode should be counted as a MIRV'd launcher. However, this formulation, if rigidly applied to both the Soviets and the U.S., would force all Minuteman silos to be counted as MIRV'd launchers! There are ways to compromise this question, but it is clear that the standards of verification which will have to be adopted in dealing with the question of the numbers of MIRV'd launchers might well have to be lower than those we have been accustomed to. On the other hand, it is also clear that the military significance of even a substantial deviation from the agreed number of 1320 MIRV'd launchers is minor. In fact, a real question exists whether a nation would gain or lose by MIRV'ing a larger number than 1320 missile launchers: MIRV'ing a missile implies a loss in total explosive power carried but a gain in multiplicity of targets. With the MIRV'd warheads already numbering in the many thousands, is a further increase in that number of use?

3. New Systems Under Development Have Impact on the Significance of the Vladivostok Agreement

New strategic systems are under consideration and are included as research and development items in the Administration's FY 1976 Budget, which could well negate many of the opportunities of the Vladivostok Agreement. Similarly the Soviets have many new weapons systems under development. For instance the sea-launched cruise missile, once deployed, would add a large number of additional long-range delivery vehicles to the inventories which are difficult to verify. The range of a cruise missile is very difficult to identify from its external appearance, and the launchers can in fact be very similar to those of conventional torpedo tubes.

Other new systems, in particular mobile ICBM's, could similarly frustrate a numerical ceiling on agreed future reduction of land-based ICBM's. Mobile ICBM's are of greater use to the Soviets than to the U.S. As part of the SALT I negotiations, the U.S. made a "unilateral declaration" that we would consider deployment of mobile ICBM's a violation of the 1972 Interim Agreement. Depending on the basing pattern and system of mobile ICBM's, it would be difficult to verify the number of mobile launchers.

4. The Vladivostok Agreements Impose Little Qualitative Constraint

Beyond the separate limit on MIRV'd numbers and the sub-limit on Modern Large Ballistic Missiles (carried over from the Interim Agreement at SALT I), the Vladivostok Agreement in itself provides no restraints on qualitative improvements of the strategic force. Upgrading of accuracy, the use of maneuvering reentry vehicles, and substitution of new generations of improved missiles or missile launchers can proceed unimpeded. Yet it is such improvements and new systems which could introduce new sources of strategic instability and which could aggravate the verification difficulties alluded to above.

V. CAN THE VLADIVOSTOK AGREEMENTS BECOME A CONSTRUCTIVE MOVE?

The above discussion indicates that the SALT negotiators will be hard-pressed to convert the Vladivostok Agreements into a viable SALT II treaty by the time of the Brezhnev visit. It is probably not feasible to consider negotiating any but the minimum constraints beyond the Vladivostok guidelines into such a treaty, particularly in view of the deterioration of Soviet-U.S. relations since the Ford-Brezhnev meeting.

I share the sentiment of many members of Congress in wishing that a more restrictive arms control agreement had been reached at Vladivostok. However, amending the Vladivostok guidelines now during negotiations through Congressional directive for a more restrictive agreement, is ill-advised: such a move would undermine prospects for an agreed treaty and would tend to undermine the ability of the Executive Branch in negotiating future arms control agreements. Rather, I recommend to the Congress that it

(a) Exercise its power, primarily through its budgetary authority, in assuring that the new opportunities for a slow-down in strategic weapons initiation which the Vladivostok Agreements have provided will indeed be reduced to practice, and that the danger of having the agreements lead to an actual escalation of strategic arms be avoided; and

(b) Press for negotiation of a speedy follow-on treaty of greater restraining power—both through quantitative reductions and qualitative brakes on the evolution of new systems.

A SALT II treaty based on the Vladivostok guidelines should only be another step in a series of further restraining agreements. Thus the Congress should share the responsibility for preventing the ongoing series of SALT negotiations from just deflecting the arms race, rather than averting it; moreover, the SALT negotiations should not be used as a lever for actually accelerating military development and even deployment. This trend has emerged in this country through the "bargaining chip" philosophy expressed by the Administration through support of proposed military systems or developments as being needed to provide leverage at the bargaining table with the Soviets.

History is making it abundantly clear that the "bargaining chip" technique is escalatory and ineffective in negotiating with the Soviets, in particular if the "chip" involves advanced technology. The primary reason why it has been impossible in the past to arrive at an accommodation with the Soviets in the control of MIRV is that the Soviets do not wish to be frozen in a position of inferior technology. Therefore, the unrelenting advance carried on by the United States in MIRV deployment and in research and development programs generating more accurate MIRV warheads which carry higher explosive power has now been demonstrated to be the reason why the U.S. may be facing 1320 MIRV'd Soviet launchers in the future. The history of the arms control negotiating relationship between the United States and its Communist adversaries has been replete with such incidents. As long as U.S. military technology in a given area is vastly superior to that of the opponents, a negotiated agreement cannot be reached—this was the case during the early period of extreme nuclear superiority by the United States and it is now the case in relation to China: At this time the Chinese tend to view arms control negotiations as a means of freezing the lesser developed parts of the world in a position of inferior technology.

Let me summarize: The Vladivostok accords can become a turning point toward truly effective arms control leading to a saner level of strategic armaments if the Congress takes initiatives to:

Deflate the oratory which gives unmerited significance to specific numbers of nuclear weapon delivery systems.

Reject the "bargaining Chip" approach as a basis for increasing strategic expenditures by disapproving authorization of development and deployment of new strategic systems which are not needed for justifiable military missions.

Exercise restraint on authorizing new development and deployments, considering the limits the Vladivostok agreements place on the evolution of the long-range threat.

Press for speedy follow-on negotiations subsequent to a SALT II treaty along the Vladivostok guidelines, to achieve reductions of weapons below the Vladivostok ceilings and qualitative constraints to slow down the technological arms race.

If, and only if, these additional initiatives are successful, will the Vladivostok agreements enter into history as a decisive move reversing the "race to oblivion."

Senator SYMINGTON. Thank you, Doctor.

Senator Church has to leave shortly for another meeting, and I yield my time to him.

Senator CHURCH. Thank you very much, Mr. Chairman.

First of all, I want to commend you for a very thoughtful statement, Professor Panofsky.

ARE ARMS CONTROL AGREEMENTS MEANINGFUL?

I have long been interested in arms control agreements from the time I first came to the Senate. I advocated the limited test ban treaty as a way to break the deadlock in those extended negotiations. And I

have applauded each new agreement as a stepping stone toward the rational control of these lethal weapons. But I sometimes wonder, Doctor Panofsky, whether we are not really kidding ourselves, whether these agreements have been meaningful at all. I am not certain, but the more I look back, the more I am inclined to think that we have really been kidding ourselves.

I know there are some very knowledgeable people who now regard the limited test ban as a very grave mistake. It is true that it brought an end to the testing of nuclear weapons in the atmosphere, but it is also true that it removed all political pressures, which were very considerable at the time directed toward ending all testing, thus forbidding the military in both the United States and the Soviet Union from proceeding as they wished with the development of new technologies, knowing that the political pressures were off and that the testing would be done underground, which was sufficient for military purposes.

I think back upon our Non-Proliferation Treaty, and wonder if that, too, has not become another empty gesture, because I can hardly reconcile the whole purpose of that treaty with present policy in which, among other things, we are going to supply Iran with half a dozen nuclear reactors, without any real control over the use of their by-products, which can readily be turned into the production of nuclear weapons.

I wonder how seriously we really mean to seek the enforcement of the Non-Proliferation Treaty in the upcoming meetings?

Now, finally, this Vladivostok agreement, which, by your own words, has ratified an agreed level of weapons on both sides so high as to accommodate all of the military plans for new development, new technology, everything both countries want to do—and that is called arms control!

I don't take serious issue with your paper. If the Congress were to follow through in the way you suggested, if the President and the administration were to support the recommendations you make, if there were a way to deflate the oratory and those who demagogue and thus exploit the peoples fears, if all of these things could come to pass, perhaps the Vladivostok agreement could be turned to some future advantage. But those ifs don't really coincide with the realities of the past 15 years.

HAVE WE MADE SIGNIFICANT PROGRESS IN ARMS CONTROL?

I suppose this is my question to you, as an expert, and I ask it quite sincerely: Do you think we really have made significant progress in the field of arms control, aside from all the fanfare, all the talk and all the agreements?

Mr. PANOFSKY. Senator Church, I share essentially all of these negative assessments which you have made, but I do believe that the net result of the arms control agreements during the last decade has been in fact a positive achievement.

I do believe the world would be in even worse shape without them than with them, but I do believe, and this is my main concern, that the pace of arms control agreements has been outstripped by the pace of technology: The main task for SALT III—Professor Doty will address himself to that—must be to somehow give diplomacy a chance.

That means have the pace of the diplomacy be such that arms control agreements can keep up with the evolution of military hardware, otherwise I think the problem is really the one which you identify.

We have the same situation as the doctor who prescribes medicine whose side effects may or may not be worse than the disease, depending as to whether the side effects are properly identified and treated.

The side effects are the excessive emphasis on numerology of nuclear weapons which has been produced by the negotiations. Another side effect is what I like to call the bypass phenomenon; for instance when we forbid atmospheric testing, but we actually accelerate underground testing. Then we have what I like to call the safeguards phenomenon, namely, that we adopt excessive measures to protect ourselves against abrogation of the treaty by the other side, as we have done in the case of the Limited Test Ban Treaty in 1963. Then we have the getting in under the wire syndrome where after the Threshold Test Ban Treaty of 1974 was negotiated, immediately a request for accelerated nuclear testing above the threshold was introduced by the administration, and partially approved by the Congress. Finally, we have the bargaining chip philosophy by which we must actually accelerate armament in order to achieve bargaining chip leverage at the table, and thereby justify military systems to the Congress which we actually could not justify in terms of their military merit and security needs.

Now, these are all side effects, detrimental side effects of arms negotiations, and I believe there is no simple panacea to avoiding these side effects other than to meet them head on, and it is for this reason that I am addressing this problem in testimony before this committee.

Senator CHURCH. I suppose that it is in summing up all those side effects that I come to the question of whether we are taking one step forward and two steps back?

I hope that you are right in your assessment that perhaps we are taking two steps forward and one step back. But it seems to me that among the various agreements only the ABM Treaty has much substance. That was the one place where both sides were able to say no, we will not proceed with the development of this weapon.

You keep coming back to the ABM Treaty in your paper, as the one place where it is clear we gained some ground.

As a part of the Vladivostok agreement, there was a talk of a threshold treaty for subterranean tests. The threshold, from what I understand, again has been set at a level which accommodates the military on both sides; in other words, there is no real need in developing new weapons to explode nuclear devices that exceed the threshold anyway, so the game continues.

NEED FOR COMPREHENSIVE TEST BAN

Do you see a serious need for a comprehensive test ban that would simply prohibit further testing?

How would you assess the need for that today?

Mr. PANOFSKY. Senator Church, I submitted extensive testimony on this general subject to this subcommittee before, particularly in relation to the Threshold Test Ban Treaty and its relationship to the peaceful nuclear explosion question. As you probably know, the

Threshold Test Ban Treaty has not as yet been submitted for ratification by the Senate.

I view the need for comprehensive test ban treaty primarily as a very urgent one in connection with the problem of limiting nuclear proliferation. I do not view it as an important measure for direct arms control.

I believe that both in the strategic and tactical field, the question of military power of the two nations is very insensitive to future nuclear developments. The art of nuclear devices is fairly mature, and the actual outcome of military conflict is very much more sensitive to such nonnuclear improvements, as upgrading of accuracy, or command and control development, and many other such items. So it is now so late that a comprehensive test ban treaty is not going to be a major factor in limiting military armaments, but I do believe it is of overriding importance that we sincerely and in good faith pursue it. This country has adopted a solemn obligation, both under the 1963 Limited Test Ban Treaty, and under the 1970 Non-Proliferation Treaty, to work in good faith toward the termination of all nuclear explosions for military purposes. Therefore, I believe both we and the Soviet Union are going to draw a great deal of fire, in the forthcoming 1975 review conference of the NPT, if we do not work toward this goal. I believe that the threshold agreement with a chosen threshold of 150 kilotons, which is clearly larger than the value which can be justified by the need for adequate verification, has demonstrated to the nonnuclear world, a certain amount of cynicism by the Soviet Union and the United States to the solemn obligation which was taken under the provision of the Nuclear Non-Proliferation Treaty.

Senator CHURCH. Mr. Chairman, I appreciate your yielding to me. I have to go to the Interior Committee for a markup session. I am sorry I can't stay longer.

Senator JAVITS. Just one question. I have a similar problem as Senator Church.

NUCLEAR WAR'S PHYSICAL AND BIOLOGICAL EFFECTS

I notice with great interest, Dr. Panofsky, your brilliant statement. I thank you so much for sharing it with us. One sentence that intrigues me greatly, you say on page 7 "even the physical and biological effects of nuclear war may well hold new surprises."

Could you give us any further enlightenment of that tantalizing clue?

Mr. PANOFSKY. I might refer you to a recent public statement by Dr. Ikle, the present Director of the Arms Control and Disarmament Agency, where he pointed out the history of nuclear effects. He noted that all of them beyond the initially predicted ones; namely, prompt radioactivity, blast and fire, were actually discovered later somewhat by accident.

For instance the whole series of phenomena called electromagnetic pulse effects was discovered accidentally in subsequent tests. Recently the question of the possible damage to the ozone layer, which was identified as an unknown consequence of nuclear war, is a phenomenon

which had not been evaluated properly before, and which is now being studied in greater detail.

Also the question of what I like to call synergistic effects; namely, the increasing vulnerability of society and ecological system to partial disruption has not been studied adequately. I refer to the fact that as our civilization raises its standard of living, there is a greater interdependence of the components which support a society and the disruption of part of it will tend to have considerably more far-reaching effects than has been the case in the past.

I am simply saying that once you talk about weapons of the numbers that are permitted under Vladivostok, and if you make an assumption that a substantial fraction are used, then I believe that our ability to predict the physical and societal and ecological effects is very limited.

Senator JAVITS. Thank you very much.

Thank you, Mr. Chairman.

Senator SYMINGTON. Thank you, Senator Javits.

Senator CASE.

Senator CASE. Thank you, Mr. Chairman.

It is good to see you again, sir.

Mr. PANOFSKY. Thank you, sir.

Senator CASE. We count heavily on your advice.

DEFLATING THE NUMBERS ORATORY

In your statement you have an itemized statement of suggestions. Have you any idea how we can deflate the oratory to which you have referred? This is a serious question.

Mr. PANOFSKY. I am clearly no expert in this matter. I believe that the debate in the Congress and the public press as to who has gained or lost by the detailed numbers I think has been basically not productive, and I think all I can propose is that whenever claims of inferiority are being made because they have 10 or 20 percent more in given categories than we have, or the other way around, that the Members of Congress go and state publicly that such differences have no physical meaning any more. I see no way of doing it other than facing it head on in terms of what the realities are.

Senator CASE. It isn't just Members of Congress and the press who are guilty here, though.

Mr. PANOFSKY. I recognize that.

Senator CASE. Mr. Smith suggested who the other people might be, and you agree with that, too?

Mr. PANOFSKY. Oh, yes indeed.

Senator CASE. Do you agree with his general comment that it would be just as well if we stopped telling ourselves and the world how weak and inferior we are?

Mr. PANOFSKY. Yes, indeed, I believe that this is one of the more destructive things. Rather than emphasizing our deterrent power, which is enormous, and its invulnerability, we keep singling out selected areas in which the Soviets are ahead of us but do not mention those areas where we are ahead of them. This is the reason I identified in my statement that the "matching in kind" strategy which is being proposed in the recent two annual Defense Department Reports

is fundamentally an escalatory one. We can obviously find areas where we are behind, so we have to match those, the Soviets can find areas where they are behind, and they will have to match those. So I cannot think of anything else which is more of a prescription for escalation than that announced policy, and I gave the quotation from last year's message from the Secretary's statement.

I also would like to join Ambassador Smith in pointing out that it is very unfortunate that the only message on strategic policy which the Congress has received during the last 2 years has originated from the Defense Department. The Defense Department naturally presents a report based on its responsibilities. A really broad statement by the President as has been given in the previous years, dealing with questions of policy in arms control and strategic policy would be most helpful in giving some focus to these types of discussions.

Hopefully, such a statement would help to deflate the oratory dealing with specific numbers.

Senator CASE. I think you are quite right. I expect that in part the absence of that kind of authoritative statement has been one of the effects of Watergate.

SECRETARY OF STATE'S COMMENT ABOUT MEANING OF STRATEGIC SUPERIORITY

The Secretary of State, I think, has been quoted as asking what strategic superiority meant. The implication of that comment was quite clear.

Mr. PANOFSKY. Yes, sir; he gave that in his press conference immediately subsequent to the summit meeting, on March 3, I believe, where he said "What does superiority mean, what do we do with it?" He was going in the direction which I believe one should go, namely, to deflate the public debate of superiority and inferiority which really has lost any physical and technical meaning.

MUTUAL HOSTAGE SITUATION

Senator CASE. You are not in any way suggesting, to use another kind of jargon, that we ought to assume the risk. What you are saying, I take it, is that there is no risk to be assumed and that we are far away from any consideration of risk?

Mr. PANOFSKY. I am saying that.

Senator CASE. I think you can scare people to death by saying we ought to assume the risk in order to accomplish something else. That isn't the point, is it?

Mr. PANOFSKY. That is not the point at all. I am, however, saying that the mutual hostage situation of the population between the two sides, you may call it a risk or whatever you wish to call it, is a reality. That situation is not going to get changed substantially by shift in strategic policy.

In fact, one of the main points on which I take issue with Mr. Schlesinger is that he makes the implicit assumption that if we change our strategic policy that the other side does also. He makes the implicit assumption that if he decides that a highly limited counterforce strategy might reduce casualties, that this will automatically be responded to in kind. Therefore, automatically, our population would

be left at risk if we adopt that policy, and it is on that score that I perceive a real logical flaw.

NECESSITY OF CHALLENGING NEW STRATEGIC DOCTRINE

Senator CASE. Since you mentioned this matter of the new doctrine, you have to challenge that doctrine, haven't you, if you are going to exercise restraint on authorizing new weapons?

Mr. PANOFSKY. Yes, I believe so. The Secretary emphasizes that to exercise the new doctrine, the primary thing which has to be done is to modify command and control, to permit more partial responses, and I am highly in support of that particular move. In fact, I believe that the Secretary, to some extent, is setting up a straw man by implying that. An all-out, antipopulation response has not been the only response at our command in the past. What the Secretary has added in the name of "flexible response" is a hard silo counterforce response and a large number of specific new research and development initiatives focused on that one new means of responding are proposed in the Secretary's report. As far as I have been able to read into the statements, the only justification which he gives for the counterforce posture is the "matching in kind" justification, meaning that if they are able to do it, we must be able to do it. Explicit identification of the strategic utility is not given.

RESEARCH AND RESTRAINT IN DEVELOPMENT

Senator CASE. I take it you don't in any of your suggestions or thinking on this matter, suggest we shouldn't do everything which we need to do in the way of research, or do you? Can you limit research, and should you?

Mr. PANOFSKY. I believe we should be doing everything we should do in research, basic and also applied, but we should begin to exercise restraint very heavily in development.

Senator CASE. Would you develop that point a bit?

Mr. PANOFSKY. Well, of course, there is a continuous chain between basic research, applied research development, test and partial deployment, full deployment and I believe, for instance, that the decision where to cut this chain depends on the time urgency of the move. I specifically believe that, for instance, in respect to development which means a full demonstration of a technical capability which we already know to be feasible, there I think some restraint is necessary unless there is a great time urgency.

As an example, I believe that development of maneuvering reentry vehicles should not be pursued at the rate indicated or in the manner indicated by the Defense Department, because it is a potentially destabilizing development. The only justification given by Mr. Currie in justifying it, that it would be needed for penetrating ABM defenses. On the other hand, we all know that it can also ultimately lead to pinpoint accuracy, and, therefore, be a destabilizing influence.

So the specific justification given by the Director of Research Engineering here relates to just those defenses which SALT I has eliminated and Mr. Currie only supports it as a hedge in case that would be abrogated and violated. This means he is looking ahead firstly to

abrogation or violation, and then to full-scale, country-wide deployment of ABM defenses. So that means he is looking greatly in excess of a decade. So, therefore, I do believe that development decisions such as MARV are a subject for restraint in view of the realities where arms control has given us some help.

Senator CASE. The need for restraint doesn't apply only to people in charge of our strategic operations, it applies also to Members of Congress when there is another witness waiting.

We can talk all day with any one of these three men, and gain from it. We have to consider that Doctor Doty has been waiting a long time, and time is getting late; so I would ask that any further questions that I might have be presented to these gentlemen in writing, and answered for the record.

Senator SYMINGTON. Without objection, and I will do the same with some questions that I have for you, Doctor Panofsky. I will ask that you supply the answers for the record.

Mr. PANOFSKY. I will be happy to.

MASKING PRODUCTION MONEY IN RESEARCH AND DEVELOPMENT PROGRAM

Senator SYMINGTON. I was very impressed with the dialog between you and Senator Case on this question of research and development.

Senator CASE. I am glad you picked that up.

Senator SYMINGTON. Because, to my mind, one of the ever more clear methods of getting money for future production is to mask it in the research and development program. For example, the Trident is still asking for a tremendous amount of money for research and development, even though it has been put into production, and the B-1 has never been allowed out of research and development. I think that illustrates the point you and Senator Case developed. Yet research and development is, as everybody says, one place we must stay ahead. And so they appropriate the money in the main each year. This year they are asking for over \$10 billion, and that figure embraces a great deal of, in effect, production.

Thank you, Doctor Panofsky.

Doctor Doty, do you have a statement?

STATEMENT OF DR. PAUL DOTY, PROFESSOR OF BIOCHEMISTRY AND DIRECTOR OF THE PROGRAM FOR SCIENCE AND INTERNATIONAL AFFAIRS, HARVARD UNIVERSITY

Mr. DOTY. Yes, sir.

Senator SYMINGTON. We welcome you here also as one of the experts in this field, and we would appreciate your testimony.

Mr. DOTY. Well, thank you, Mr. Chairman. I shall be brief.

REASONS FOR CONSIDERING FOLLOW-ON TO SALT II TREATY NOW

I greatly appreciate this opportunity to join with you in a discussion of the Vladivostok Agreement. Since Professor Panofsky has dealt mainly with its assessment, it may be more profitable if I focus on the next steps that should be considered after a SALT II Treaty based on

the Vladivostok Agreement is signed. With all that the Senate has to do, it may seem a bit futile to urge it to think now about the follow-on to a treaty that is itself at least several months away. However, there are compelling reasons to do this:

(1) A lively discussion, even a debate, on what the next steps should be would be the best insurance against the kind of neglect of arms control by both governments that occurred in the 2 years following SALT I.

(2) Pointing out how little strategic arms limitation came out of Vladivostok may be a justified complaint, but it is not a remedy. Planning what should come next is a remedy. I regret that the complaint is consuming more of our efforts than the remedy.

(3) The most serious flaw I see in the SALT process is its seeming inability to catch up with the rapid rate of technological change, on the one hand, or deployment of weapons not yet subject to control, on the other. A collective looking ahead and arguing for one course or another is the first step in speeding up and vitalizing this process.

(4) Perhaps the most urgent reason for greater haste lies in a technical situation that is widely overlooked but, I think, very important. I refer to the fact that our ability to plan and undertake the limitation of strategic delivery systems is largely due to our ability to verify their numbers through satellite reconnaissance. If this capability is badly eroded, our present approach to strategic arms control will be compromised, and there is no alternative in sight. The source of a breakdown in present verification systems lies in the development of conciliable delivery systems, that is, mobile ICBM's, and long-range air-launched or sea-launched cruise missiles. These kind of new systems must be dealt with very soon if strategic arms control as we now view it is to have a chance.

(5) Finally, we and the Soviet Union will soon face a reckoning. For a dozen years, since the Partial Test Ban Treaty of 1963, treaties have been made, roughly one a year, and now with the conclusion of a treaty based on the Vladivostok agreement, we will have come to the end of what can be done without actually limiting strategic weapons. With the exception of the ABM Treaty, no serious limitations are yet in view: No new weapons systems have been cut back, no new developments have been stopped. The SALT II Treaty we expect will bring us to the brink of really controlling strategic arms: Either we will move forward into a new era or arms control will have failed. This will be clear to all in a very few years. I believe the kind of world order we will have in the 1980's and beyond will depend very much on which course the Soviet Union and the United States take. This, then, is the overriding reason to plan and urge governmental action on a greatly accelerated schedule.

KENNEDY-MATHIAS-MONDALE RESOLUTION

It is widely claimed that the United States is passing through a period of uncertainty, that it is hesitating. There is evidence for this in the very subject we are discussing. Why has only about one-third of the Senate agreed to cosponsor the Kennedy-Mathias-Mondale resolution during the 3 months since it has been put forward? As

you know, it supports the Vladivostok agreement while at the same time urging mutual restraint in deployments beyond current levels while seeking further mutual limitations and reductions. It proposes that the United States not build up to the Vladivostok ceilings unless security needs alone require it. Finally, it asks the President to reach further agreements including (1) mutual restraints on the pace and character of development and deployment of strategic weapons systems; (2) a lowering of both ceilings—aggregate and MIRVed missile numbers; (3) negotiations for limiting military forces not covered by the Vladivostok Agreement.

The resolution is supported by the leadership of both parties and by the Secretary of State. It is a clear bipartisan call for a stepped-up effort consistent with the points I have just made. With the Secretary's approval, it cannot be read as intruding into the administration's prerogatives in negotiation. It is a sensible expression of direction, not a detailed prescription which invites exception. To my mind, it is an expression of precisely the kind of leadership the public should expect from the Senate. If it is not provided in this or some equally clear form, the Senate will truly have hesitated when its leadership was greatly needed.

SENATOR JACKSON'S PROPOSAL

More recently—March 26, 1975—the Senate heard a different proposal, from Senator Jackson. It suggested that:

Each side designate 700 of the older of its permitted total of 2,400 strategic delivery systems to remain unmodernized over the lifetime of the Vladivostok Agreement.

The motive here is to identify the most likely candidates for later reductions with the expectation that 30 percent reductions could be negotiated later. Since the weapons designated could not be upgraded or modernized in any way, the incentive to move expeditiously toward scheduling their dismantling would exist from the outset. Moreover, because each side would make its own designation of the weapon systems that would not be modernized, it should not be a difficult negotiation.

This is a sound, attractive proposal that addresses the most obvious shortcoming of Vladivostok. I stop short, however, of endorsing Senator Jackson's insistence that this proposal be negotiated as a codicil to the SALT II Treaty. In view of my recent visit to Moscow, I am persuaded that with the increased strain on the Soviet-American relation any attempt to revise the guidelines for SALT II will be viewed as mischievous by the Soviets, and at best would delay the treaty. Moreover, if mutually desired, the same result could be obtained within a year or two after the SALT II Treaty in a separate negotiation and with the same benefit. Clearly, the proposal as such could be widely supported without insisting it be a part of SALT II, as advantageous as that result would be.

TWO BASIC DIRECTIONS FOR SERIOUS ARMS CONTROL

If the Senate does come to share the urgency which I attach to making a start on substantial limitations in strategic arms soon, what

can be done beyond supporting the proposals now before it? Professor Panofsky has presented some specific suggestions and I support these. But there is, I believe, a more fundamental and demanding challenge. It has its origin in the unavoidable fact that if serious arms control is in view there are only two basic directions it can take and both of these confront determined obstacles both here and in the Soviet Union.

These two main directions are obvious enough. They are (1) control over the number of weapons systems and (2) control over the improvement of weapons systems or the development of new ones. Progress in arms control means in the case of (1) reductions, and in the case of (2) slowing the pace of improvements or banning the development of certain systems.

Consider very briefly the pros and cons for each case. There are at least five points in favor of mutual balanced reductions: First, it provides a means of compensating for the inevitable improvements that will go on in allowed systems. Reductions at a properly chosen rate provides a counter that can hold strategic capability constant, or even diminish it. Second, set at moderate rates, it provides for the orderly elimination of old weapons systems without their being replaced by new ones. Third, it engages the military of both sides in an institutionalized process of scheduled reductions and verification. Fourth, it provides a highly visible sign to all that arms control is at work; forces are being reduced by the most obvious index, numbers. Finally, the process can be made readily verifiable.

Against this list of positive features is the break with tradition that the destruction of potentially usable and obviously costly weapons constitutes. Such destruction will not come easily to either the conventional soldier or the thrifty taxpayer, or Congressman. One can imagine that once the destruction of some weapons had occurred on both sides attitudes about producing new ones would also change. Nevertheless, I have observed less reluctance among our military to this way of proceeding than with the other. Indeed, some admit to a surplus which we could well abandon if the other side would do the same.

The other mode of serious arms control, restraining the pace of improvements or new systems development, is more controversial because it restrains technology. For the United States this threatens the hedge which it is widely believed we have over the Soviets. For the Soviet Union it smacks of a scheme of freezing them into an inferior technological position. Yet it is here that the arms competition is fueled. And, it is usually the United States which fuels it in that we are the originators of almost all the strategic systems now in use.

To slow the rate of improvement of missile systems, the most obvious route is to limit the number of test flights since these can generally be observed. With such limits imposed, a slowing of development will occur even if much more costly substitutes can be found in more sophisticated ground tests. Moreover, such restraints also diminish testing of missiles on station, and thereby prevent the development of sufficient confidence to threaten a first strike.

MODES OF PROCEEDING WITH ARMS CONTROL OF STRATEGIC SYSTEMS

In other cases, it may be possible to negotiate the banning of new developments. Mobile missiles are a clear candidate because of the

manner in which they would frustrate verification, particularly in the event that reductions were in view since an uncertain residue is more significant at low levels than at high levels. Indeed, it would be interesting to analyze what additional arrangements would be needed to make possible the banning of the development of all new systems during the 10-year period which SALT II is to occupy.

Although I have only been able to open the subject, I hope that enough has been said to make the point that in both these modes of proceeding with arms control of strategic systems there are substantial tensions. These cannot be hidden because it is existing or promised military capability that it is proposed to pare away on both sides. Yet it is with these tensions and the arguments and counter arguments that Congress will have to become concerned just as in the past it has had to immerse itself in arguments over throw weight, yield, CEP—circular error probable—and the like.

CONCLUSION

I close with the hope that there will be another occasion in which specific proposals for reductions and limitations on improvements and developments of new systems can be discussed. This should be the heart of SALT III: the sooner we can engage it the better.

Thank you.

MR. SMITH'S CONCURRENCE WITH DR. DOTY AND DR. PANOFSKY

Senator SYMINGTON. Thank you very much, Professor Doty.

I am grateful for Ambassador Smith's staying with us through this session, and I am wondering if there is anything either Dr. Doty or Dr. Panofsky have said that you specifically disagree with?

Mr. SMITH. No, Mr. Chairman, I would think that people might almost believe that we had concerted our statements in advance, which I want to deny. I think there is a good deal of concurrence in them, and it gives me confidence that I am not wrong in what I said to you.

DR. DOTY'S AGREEMENT WITH AMBASSADOR SMITH

Senator SYMINGTON. I would like to ask you, Dr. Doty, is there anything in Ambassador Smith's statement that you disagree with?

EXPANSION AND RELEVANCE OF CIVIL DEFENSE PROGRAM

Mr. DOTY. No.

I think if I could I would like to particularly support his contention regarding the apparent effort to expand and make more relevant to the Department of Defense policy the civil defense program.

A dozen years ago, I was a member of the President's Science Advisory Committee, and I chaired the panel on reviewing the civil defense in the wake of some rather hasty efforts that the administration had taken to build it up. The exhaustive studies that we went into there, I believe confirmed that what then was put in motion, a very modest and low visibility fallback program, was about all that we could justify. We cannot reorient the lifestyle of the United States, and ask the citizenry to undergo a continuous process of exercising a more complex

system unless we are willing to generate and maintain a sense of danger that is absolutely inconsistent with all that I think we should be seeking.

Senator SYMINGTON. Thank you.

I will ask unanimous consent that some questions I was going to ask you be put into the record, and that you answer them at your early convenience, so we can get these hearings printed up and in the hands of the Senate.

DR. PANOFSKY'S AGREEMENT WITH AMBASSADOR SMITH AND DR. DOTY

Dr. Panofsky, could I ask is there anything that Ambassador Smith or Dr. Doty have said with which you disagree?

Mr. PANOFSKY. No; I don't.

DEFENSE DEPARTMENT STATEMENTS ABOUT STRATEGIC FORCE VULNERABILITY

I would like to specifically comment on Ambassador Smith's reference to the rather inconsistent statements about Minuteman vulnerability which appear in the statement by various Defense Department officials.

I would like to add to that list that on page II-18 of the fiscal year 1975 and fiscal year 1976 transition budget, the Secretary enumerates the time sequence of vulnerability of the different elements of our strategic force, namely, the land-based bombers and the ICBM and he identifies the problem of how it is impossible to synchronize an attack against the bombers and the land-based force in such a way as to avoid giving adequate warning.

I would like to remind this committee that this was precisely the evidence which was introduced during the ABM debate many years ago, when Secretary Laird identified ICBM vulnerability with total vulnerability of all the forces. I am happy to see that here the statement is now being publicly agreed with that even if Minuteman was vulnerable as a separate force, this would be a very long leap to vulnerability of the entire deterrent.

SELF-DEFEATING NATURE OF GOING TO CIVIL DEFENSE POSTURE

The other comment I would like to make is also on the question of civil defense. I agree with Professor Doty's remark, but again I would like to emphasize the self-defeating nature of going to a civil defense posture. In that case, the vulnerability of the U.S. population is partially decreased; the Secretary simply appears to make the assumption that the other side would consider this to be a matter of positive value, that there be fewer casualties on our side. However, entirely at the discretion of the other side, the casualties could be increased.

So we have again the same kind of argument which we had before about the escalatory nature of civil defense and ABM measures. We thought that these arguments had been resolved in terms of the SALT I ABM Treaty. I agree completely with Ambassador Smith and am grateful to him to point out the basic inconsistency between the ABM Treaty and some of the civil defense implications which are being introduced by the Secretary of Defense in his message to the Congress.

NECESSITY OF TRIAD FORMATION QUESTIONED

Senator SYMINGTON. Before yielding to Senator Case I want to thank you.

I make the observation that Dr. York, who is a former Director of Research and Engineering in the Pentagon, testified some time ago that if we had known all the systems would work, it would not have been necessary to put all of those billions into the Triad formation. It might have been well to have gone with less than three particularly in light of the increasing problem of cost as it enters into this picture, not for the first time, but more essentially in recent months and years than ever before in some 30 years I have been in the Government.

Senator Case.

Senator CASE. Thank you, Mr. Chairman.

APPEARING TO KEEP UP WITH OTHER SIDE

Our witnesses have been most patient with us, and you have been, too, and I don't want to extend this unless somebody would like to make a general comment on the general point. I know that Dr. Schlesinger has this strongly in mind. I am sure that the Secretary of State does. It was a matter that the former Secretary of State was always emphasizing, and I think he still does, very strongly, that you don't have to have just enough to destroy the other side, and have an invulnerable capacity, but it also had to appear that you were going to keep up with the other side in order to prevent political instability in the world among other nations who might come to feel that if America did not keep up with Russia, to be quite specific, in throw-weight and in number of weapons, America could not be relied upon. According to this concept, we could find ourselves alone and the rest of the world would be Finlandized. That is a feeling that Dean Rusk had, and still has. I think. I think Mr. Acheson had it, to some extent, and I am sure Dr. Schlesinger has made no bones about his feelings on this score.

I wish you would comment generally about this.

Mr. DORR. Very briefly, I can't forgo the opportunity to do so, because I believe that this doctrine of allowing the perception to dominate the sizing of our forces has grown far out of proportion.

Back at the beginning I think there was, and still is, broad agreement that we must not allow very large differences to develop in this particular period. But there is a great difference between that rather relaxed posture, based on the assumption that only a small amount of the forces would ever be used in any foreseeable engagement, and the preoccupation with extending it to the point that it is a prescription for a new kind of arms race. Because as you know so well, there are a half dozen, perhaps a dozen, different important parameters of the strategic force, and if one attempts to put the United States ahead in a certain number of them, it will automatically go ahead in others, and this produces a situation on the other side, if they responded in kind, they will push ahead to meet us on certain parameters, and as a result they will also move ahead on others. There is simply no possibility in bringing two such complex systems into total equality. It seems to me so unnecessary to insist upon this kind of matching when perception itself is so subjective.

The issue at hand is or ought to be much more one of sufficiency, using the dictionary meaning of the word sufficiency, and that is a situation which we may have to address ourselves to in the future.

Senator CASE. Gentlemen, would either of you like to say a word on that subject?

Mr. SMITH. Well, Senator Case, I would merely cite one example which puzzles me. If we really do believe that we must match the Soviets in all important aspects, we presently see a tremendous Soviet anti-aircraft program, surface-to-air missiles, and we presently are allowing our own anti-aircraft system to run down, and the reason that is given is that if the Soviets can destroy our cities with their ICBM's and we have no accurate defenses against that, it is hardly logical to maintain a large anti-aircraft program.

Now, it seems to me if our Administration is logical, we would say the Soviets have this tremendous anti-aircraft program. Perception will look bad if we don't have the same thing.

Granted the Soviets do not have the bomber force that we have, but they do have intercontinental bombers. We are very concerned about including the Backfire bomber, I understand, in the present Geneva negotiation. So that there is a case where we have decided we can live with an asymmetry, and by the same token it seems to me the Soviets have to live with symmetry, and we are going to have to live with some which do not favor us.

Senator CASE. Doctor Panofsky.

POLICY OF APPEARING TO KEEP UP

Mr. PANOFSKY. Yes; I would like to emphasize again that a policy of appearing to keep up, to use the words which I believe you asked is a very dangerous policy if the physical realities of those systems which you use to preserve that appearance are as awesomely destructive as we are talking about.

I think as responsible individuals, we can not permit ourselves to use, for appearance sake objects whose characteristics are as all destructive as they are.

It is in this sense that I think we technicians have an obligation to keep reminding the policymakers about the realities, the nature of the symbolic objects which they are using.

Senator CASE. Thank you very much.

Senator SYMINGTON. And, I want to thank you all very much.

UNDERSTANDING OF AND INTEREST IN NUCLEAR DEVELOPMENT

When I came fresh out of the Pentagon to the Senate, over 20 years ago, there was very little understanding or interest in nuclear development. I went to the chairman of the Armed Services Committee at that time, and suggested that we should dig into it in the committee: and he, a very fine gentleman from Massachusetts, said that it was so secret that he did not think that the Armed Services Committee should pursue it.

Eighteen years later, in 1971, the chairman of the Armed Services Committee said he felt the same way about it.

I want to do all I can to get the people not only of this country but of the world, to understand the great force we are talking about which can either give us a better living and longer life or destroy us.

Thank you all very much for your courtesy and kindness in being with us this morning.

The hearing will adjourn, subject to the call of the Chair.

[Whereupon at 1 p.m., the hearing adjourned, subject to the call of the Chair.]

NON-PROLIFERATION ISSUES

MONDAY, APRIL 28, 1975

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, McGovern, and Case.

OPENING STATEMENT

Senator SYMINGTON. Today, the Subcommittee on Arms Control, International Organizations and Security Agreements of the Senate Committee on Foreign Relations continues hearings on the Vladivostok accord and related strategic arms issues.

Our witnesses this morning are the Honorable Paul H. Nitze, former member of the SALT delegation, and former Deputy Secretary of Defense, and Dr. George Rathjens, professor of political science, Massachusetts Institute of Technology.

Both gentlemen have been asked to discuss the national strategic policy and arms control implications of this latest round in the strategic arms limitation talks.

Mr. Nitze, we are very glad to have you with us this morning, and also Dr. Rathjens.

Have you a prepared statement?

STATEMENT OF HON. PAUL H. NITZE, FORMER MEMBER OF SALT DELEGATION AND FORMER DEPUTY SECRETARY OF DEFENSE

Mr. NITZE. I have, Mr. Chairman.

Senator SYMINGTON. Would you read it to us?

Mr. NITZE. Mr. Chairman, before dealing with SALT in the context of the Vladivostok accord, I believe it would be helpful to recall a few of the basic historical points. It was in the late fifties, even before Sputnik, that many of us became concerned with the stability of the nuclear relationship between the Soviet Union and ourselves. Our nuclear strategic capability and that of the Soviet Union were then largely concentrated in our heavy bomber forces; those forces were deployed on a small number of airfields; early warning systems had substantial gaps and could be evaded; a well executed surprise attack could have the prospect of emasculating the strategic forces of

the other side. Sputnik, and the possibility that the Soviets might attain a threatening ICBM force before we could deploy an adequate counterdeterrent, further exacerbated the problem. The result was an enormous U. S. R. & D—research and development—and deployment effort to avoid those risks. U.S. obligational authority for the direct costs of program I, the strategic program, during the 6 years from 1956 to 1962 averaged some \$18 billion a year, expressed in constant 1974 dollars. As a consequence of that effort, from 1962 to the present day, the strategic relationship between the United States and the Soviet Union has been such that the Soviet Union could not have hoped to gain from a surprise attack or from preempting in a time of crisis.

U.S. DECISIONS REGARDING STRATEGIC PROGRAM IN 1960'S

In the midsixties, however, the United States decided to go down one line in its strategic program while the Soviet side went down a quite different line. I was one of those who participated with Bob McNamara in the decisions of those years. Under a stable nuclear umbrella, what counted at the cutting edge of policy were, in addition to a strong political and economic posture, conventional forces adequate to deter other forms of pressure against our allies. Economic and budgetary considerations made it wise to cut the percentage of our GNP (gross national product) and defense budgets going to program I. By and large, it is cheaper, and at least in the short run, more effective to make technological improvements than to increase force size. We decided to halt the Minuteman program at 1,000, to halt the Polaris/Poseidon program at 41 boats, and substantially to reduce the size of our heavy bomber and air defense force levels. Instead emphasis was put on improved reliability, command control, accuracy, and penetration capability, including PEN AIDS—Penetration Aids—and MIRV's and on conventional forces. In 1967 the decision was made to go forward with the Sentinel Safeguard technology despite Secretary McNamara's doubts as to its cost effectiveness. As a result of these decisions it became possible to reduce program I's real annual direct expenditures by almost two-thirds; in 1974 they were approximately \$7 billion.

SOVIET DECISIONS REGARDING STRATEGIC PROGRAM

The Soviet Union made quite different decisions. They decided, first of all, to equal and then to exceed us in the number of strategic missile launchers and greatly to exceed us in the average throw-weight of the missiles these launchers could launch. This left them with the later option technologically to improve the capabilities of this large force size. Their program has required an increase, rather than permitting a reduction, in their annual expenditures on what we would call program I.

INHERENT NEUTRALITY OF TECHNOLOGY

Many people today emphasize the potentially destabilizing nature of technological progress. To me, the lesson of the late 20 years is quite different. Technology is inherently neutral; whether it is good or bad depends on the uses it is put to and whose ox is being gored.

Without an enormous technological effort it would not have been possible for the United States to restore crisis stability by its efforts of the late fifties and sixties. Whether we will need to make a comparable effort in the late seventies and eighties is at the heart of the SALT II problem.

PROSPECTS FOR AND USEFULNESS OF NEW SALT AGREEMENT

In talking to various audiences in the months prior to Vladivostok, I was often asked whether I was optimistic or pessimistic about the prospects for a new SALT agreement. In reply I said there really were two questions to be answered. The first was: "What are the prospects for a SALT agreement?" The second was: "How useful an agreement could we expect, if one proved possible?"

As to the first question I said there were some grounds for optimism. I would expect the Soviet leaders to be more anxious to make progress, and to be more flexible in their approach, than they had been in the preceding 2 years, and in particular, more so than during the Nixon/Brezhnev summit early last summer. At that time, they were fully aware of the President's crumbling domestic support and the possibility that he might be impeached. There were no pressing reasons why they should at that time fall off their previous hard line and show flexibility on the important issues.

Things were different after Nixon's resignation. Mr. Ford could be expected to be President until at least January 20, 1977. The interim agreement expires in 1977. I said that if I were in the Soviet shoes I would try to get some kind of agreement to replace or extend that interim agreement before the election year of 1976. Second, as Soviet leaders look at what is happening to the economic and political foundations of Western Europe, Japan, the nonoil producing parts of the third world—and even in the United States—they must judge that new opportunities are opening up for them. Furthermore, I believe they see their relative military position improving as they deploy the new family of weapons which they have been developing and testing during recent years.

Under those circumstances, I said that if I were they, I would not wish to rock the boat too much. I would try to maintain détente and the special relationship with the United States. Some form of extension or replacement of the interim agreement would fit in with such an evaluation of the situation.

On the second part of the question—how useful an agreement might we expect if one were possible—I said I believed the answer would have to be much less hopeful.

The Soviets in the past have taken an extremely one-sided position with multiple built-in possible fallbacks. Even if they were to show considerable new flexibility, I did not believe they could justify to themselves giving up the superior position they saw virtually within their grasp. With a U.S. budget ceiling and continuing inflationary and balance of payments problems, they must see some prospect of our not adding to our strategic programs sufficient additional real resources to change the present relative trends. I, therefore, said I did not see how, under present circumstances, we could expect to achieve an agreement which would significantly unstress our growing strate-

gic defense problems—those arising from a potential shift from parity to Soviet superiority and from assured, to significantly less assured, crisis stability.

PROVISIONS OF VLADIVOSTOK ACCORD

This new brings us to the Vladivostok accord. That accord provides for equal ceilings of 2,400 on the number of ICBM and SLBM launchers and heavy bombers each side can have over the next 10 years; it also provides for equal ceilings of 1,320 on the number of MIRVed launchers. MRV's—multiple reentry vehicles—as opposed to MIRV's, are not to be counted under the MIRV ceiling. The accord carries over from the interim agreement a restriction on building fixed ICBM launchers at new locations and limits what are called modern large ballistic missiles—MLBM—launchers to those operational or under construction in May 1972; 308 to 320 on the Soviet side and none on the U.S. side. It provides for freedom to mix between various systems subject to the above limitations. Air-to-surface missiles—ASM—with a range more than 600 kilometers carried on heavy bombers are to be counted within the 2,400 ceiling. Administration sources have indicated that whether this limitation is to cover only ballistic ASM's as well remains to be negotiated at Geneva. Mobile ICBM launchers, if permitted, are to be counted. Forward-based systems deployed on carriers, in Europe, in the Far East or elsewhere, are not to be counted, although there may be a provision that neither side will circumvent the provisions of the agreement through deployment of otherwise non-limited systems. The nuclear systems of the British and French are not to be counted. Verification problems remain to be negotiated. There is no agreement on what bombers are to be included under the definition of a heavy bomber.

Thus, the Soviet side did make substantial concessions from their previous extreme positions. The accord gives an appearance of equality in that the number of launchers, MIRVed and un-MIRVed, permitted to each side are equal. It does not, however, deal with throw-weight—the most useful verifiable measure of relative missile capability, either MIRVed or un-MIRVed. It is difficult to see how the Accord reduced, in a meaningful way, the U.S. strategic defense problem posed by the new family of Soviet missiles and bombers which are now completing test and evaluation and whose large scale deployment is now beginning. If we do not add new strategic programs to those which are now programed, the U.S. will, at the end of the 10-year duration of the agreement, have a half to a third of the Soviet MIRVed throw-weight. The bomber forces of the two sides, in view of our lighter air defenses, would have approximately equal capability.

The Accord, provided the cruise missile problem is straightened out and others do not arise, appears not to bar the United States from doing those things which would appear to me to be necessary to compensate for or correct these imbalances. Thus, the Accord does not nail down Soviet superiority or prevent the United States from maintaining stability and high quality deterrence. But to do so would require a significant increase in the U.S. strategic program beyond those now planned or authorized. An important question before your committee is, therefore, whether the Vladivostok accord can be improved in a

manner which would make such additional U.S. programs less necessary.

NEGOTIATING TARGETS

To my mind, the basic difficulty with the Accord is that it addresses appearances rather than fundamentals. To reduce the danger of nuclear war it would be more important to limit the throw-weight of the missile forces of both sides, particularly of the fixed ICBM forces, than to put a ceiling on the number of launchers. I see no reason why the Soviet Union needs to replace its SS-9's—diesel-powered attack submarine—with MIRVed SS-18's, having six to seven times the throw-weight of our Minuteman III, nor why it needs to replace a large number of its SS-11's with SS-19's which have approximately three times the throw-weight of our Minuteman III. It is perfectly feasible for the United States to develop missiles of equally large or even greater throw-weight than the SS-19 and to fit them into our Minuteman silos. But would it not be far better for both sides if there were a sublimit of, say, 50 on the number of SS-18's the Soviets were permitted to deploy and a sublimit of 500 or less on the number of ICBM's of the SS-19 class that either side were permitted to deploy?

If such sublimits were agreed, it should then be more feasible to work out subsequent reductions in numbers of launchers which would include the older Soviet un-MIRVed missiles, such as the SS-9's, along with our Minuteman II and Titans.

Furthermore, it would seem appropriate to urge the executive branch to insist that the Soviet Backfire bomber, and perhaps our FB-111—which is approximately a third of the size of the Backfire—be included in the definition of heavy bomber. Without such inclusion, particularly in the absence of a restriction on deploying tankers for refueling, the entire concept of a 2,400 ceiling on ICBM and SLBM launchers and heavy bombers becomes essentially meaningless.

These would be difficult negotiating targets to achieve, but it is my view that the attempt should be made. If the attempt is unsuccessful, we will then have a firmer understanding of the problems to which we must then address ourselves in continuing to maintain the quality of our deterrent posture.

Thank you, Mr. Chairman.

Senator SYMINGTON. Thank you, Mr. Secretary.

Senator Case, would you like to hear Dr. Rathjens now or would you rather ask questions?

Senator CASE. I think it would be fine to hear them both first.

Senator SYMINGTON. How do you feel about that, Mr. Nitze?

Mr. NITZE. That is fine by me, Mr. Chairman.

Senator SYMINGTON. Dr. Rathjens, would you please read your statement.

STATEMENT OF GEORGE W. RATHJENS, PROFESSOR OF POLITICAL SCIENCE, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. RATHJENS. Thank you, Mr. Chairman, Senator Case.

I welcome the invitation to appear before you to discuss the problems of further limiting strategic arms.

My reaction to the Vladivostok accords is one of dissatisfaction. Far from capping the arms race as administration spokesmen claim, the accords cast some kind of a loose net or sieve over it, and one with a rather coarse mesh at that. Agreements based on Vladivostok are not likely to be militarily influential because of the possibilities for continuing the strategic arms competition which remain, and will likely be exploited. This would be true even had the Vladivostok numerical limits of 2,400 on strategic delivery systems and 1,320 on MIRVed missiles been much lower, but had limits of, say, 2,000 and 1,000 been agreed to, there would at least have been the suggestion of a reversal in trends. As it is, it is hard to avoid the conclusion that the two powers are presently incapable of agreeing on arms control measures that would interfere in any significant way with military programs for which there is strong support.

INTERPRETATION PUT ON VLADIVOSTOK ACCORDS

My initial concerns about the Vladivostok accords were heightened by the interpretation put on the accords, particularly by the President's announcement that he would feel an obligation to build to the levels permitted, and by subsequent remarks in the same vein by the Secretary of Defense. To some extent the administration has backed off from this position, presumably as a result of adverse public and congressional reaction; and, contrary to the early statements, there has also been a change in the aide memoir so that there is no longer a suggestion that negotiations on reductions will necessarily be delayed until 1985. But the fact remains that administration sentiment does not seem to have changed much, for we have Secretary Schlesinger announcing in his recently released annual report that "until we obtain solid evidence of Soviet restraint, we shall plan for deployment of approximately 2,400 strategic delivery vehicles," a number higher than is permitted us under the interim offensive agreement of 1972, and so far as I am aware, higher than was seriously considered prior to Vladivostok.

POSITIVE ASPECTS OF ACCORDS

There are some positive aspects to the accords: the fact that ceilings have been agreed to signifies mutual acceptance of an approach to the heretofore troublesome problem of aggregating disparate delivery systems; the establishment of ceilings limits slightly the range of assumptions that can be used in "worst case" analysis on which force planning, or at least force rationalization, is to some extent based; and the Soviet willingness to forego insisting on inclusion of forward based systems and those of France and the United Kingdom in numerical limits may be a precedent which is desirable from our point of view. There is also the possibility that the fact of agreement—aside from its content—may have contributed, at least in the short term, to improving Soviet-American relations.

TURN FROM NEGOTIATION TO EXERCISING UNILATERAL RESTRAINT SUGGESTED

Certainly in considering what happened at Vladivostok these points should be given full weight. Yet, my overall reaction remains negative. I do not see that a treaty based on the Vladivostok accords will have a

perceptible effect on the achievement of what I regard as the main objectives of nuclear arms control efforts; reduction in the likelihood of nuclear war and in damage to be expected should it occur. I would not go quite so far as some who have suggested that Vladivostok is to be seen as a declaration of Soviet-American intent to continue their arms competition without significant restraint for another decade, although I fear this judgment may not be wide of the mark. Rather, I would suggest that the accords might be seen simply as signifying that we have come to the end of the line, at least for awhile, on what can be done to limit strategic arms through negotiations; and that we had best turn our attention increasingly to what can be done through the exercise of unilateral restraint.

We have one substantial accomplishment from the last half dozen years or more of negotiating efforts—the ABM treaty, the one easy item on the SALT menu. But aside from that treaty, and I believe we could have had it, or even a better one, 1 year or 2 earlier but for insisting on linking it with agreement to limit offensive systems, we have accomplished little in negotiations. We have seen our weapons development and procurement processes distorted by intragovernmental bargaining and by the claim that bargaining chips are needed for negotiations with the Soviet Union. We have seen programs accelerated to get in under the wire before they might be constrained by agreement. Negotiations have been a factor in calling attention to disparities in numbers of delivery vehicles, throw-weight and numbers of warheads as if the differences are important, when in fact they are not significant militarily and are so politically in large measure only as a consequence of the constant reiteration. We have an interim offensive agreement with which there was substantial unhappiness; and now the prospect of a more lasting agreement, the nature of which is such that it is entirely possible that we will have a continuing arms competition that will be so open ended as to make a mockery of the very idea of arms control.

So I am reluctantly suggesting that it may now be the part of realism to stop taking SALT seriously. In saying this, I am not necessarily advocating that the talks be discontinued nor that any agreements reached should be rejected by the Congress. Rather, I have in mind just two points which I have already made, but which I repeat for emphasis; we should recognize that the prospects of significant agreements being reached are sufficiently slim that we ought not to permit a distortion of our weapons acquisition processes in order to strengthen our bargaining position; and second, we are more likely to make meaningful progress in arms control through the exercise of unilateral restraint than by agreement. Whether or not there is reciprocity by the Soviet Union, there is much which the administration would now have us do that we can prudently forego. For starters, we could very safely slow development and forego deploying some of the new strategic systems, for example, the Trident submarine, the B-1 bomber, and strategic cruise missiles. We could forego developing new warheads for our Minuteman missiles and deploying more MIRV's. We could retire some of our obsolescent systems without replacement: the Titan missiles, some of the older Polaris submarines, and the older B-52's.

DESIRABILITY OF MOVING QUICKLY ON AGREEMENT

But still, we have the prospect of a treaty based on Vladivostok coming before the Senate this summer. From press reports yesterday, I gather there will be as I have feared, a substantial delay. Nevertheless I hope that agreement can be reached as soon as possible and urge that the Senate, in advising the administration, emphasize the great desirability of moving quickly. I say this because I am concerned that as long as negotiations are underway we will continue to see the political, and, to a lesser degree, the military utility of superiority in strategic strength exaggerated with pernicious effects. Arguments will be made, and possibly with some effect, in favor of programs which cannot be justified on narrow national security grounds but only because of an alleged need to bargain from strength. It is that last concern which I assume motivated Senators Kennedy, Mathias, and Mondale to suggest in their resolution relating to Vladivostok that "any deployment of U.S. strategic nuclear weapons . . . should be based solely upon the actual needs of U.S. security." Moreover, the rapidity of technological change compounds the adverse effects of delay in negotiations. Opponents of agreements and those who feel it important that the basic understandings be modified to take account of uncertainties and technological possibilities will find increasing opportunities for insisting on complicating changes as time passes.

"PROBLEMS" WHICH COULD LEAD TO PROTRACTED NEGOTIATIONS

One can see the handwriting on the wall in the identification of several "problems" which could lead to protracted negotiations: concern about the adversary's exploiting "loopholes" in a treaty to deploy larger numbers of delivery systems with strategic capability than would be within the spirit of the Vladivostok accords and concern that there may be undetectable violations of a treaty. The President and the political leadership in the Soviet Union can brush such problems aside, however, just as they did the FBS problem when they were at Vladivostok. They should be encouraged to do so. The ceilings permit force levels so high—many thousands of warheads for each side—that the military balance would be virtually unaffected, if for example, one nation, but not the other, were to develop and deploy cruise missiles with nuclear warheads that might be launched from torpedo tubes of attack submarines. As another example, it need not be a matter of great concern if we should be unable to verify compliance with limits on land mobile systems—a few 100 more or less would not be very meaningful; nor would it be vital if the number of adversary missiles carrying MIRV's exceeded 1,320 by several 100, or even a 1,000, whether or not we knew it.

WHERE WE GO AFTER TREATY BASED ON VLADIVOSTOK

Where do we go after we get a treaty based on Vladivostok? Here I have trouble with the call in the Kennedy-Mathias-Mondale resolution and in Senator Jackson's proposals for early negotiations on reductions. I would, of course, like to see reductions and also limits on qualitative improvements, but am skeptical about trying to negotiate them. As I have indicated, I believe we should cut back on our stra-

tegic programs and barring destabilizing developments on the international scene it seems to me that this is likely to happen, at least to some degree, given current sentiment in the country and the Congress. Yet, as long as we negotiate within a framework, such as has characterized SALT so far, where "more is better"—or worse if in the hands of the adversary—"bargaining chips" will count. I am, therefore, dubious about our ability to secure significant agreements that would be judged acceptable assuming the Soviet Union continues its vigorous strategic programs while we exercise restraint. Yet, I am convinced that it is in our interest to exercise restraint both in our weapons acquisition policies and in touting the importance of nuclear weaponry.

FACTORS CONTRIBUTING TO POSSIBILITY FOR CONSTRUCTIVE NEGOTIATION

Does this mean there can be no hope in further negotiations? Not quite. Two factors may contribute to the possibility for constructive negotiations within a framework where the country simply refuses to go along with some of the administration's proposals for new strategic weapons programs. First, there is the parallax phenomenon: It is very likely that the Soviet leadership will see American weapons programs and policies, however restrained, as more threatening than many of us imagine, and this may result in stronger Soviet motivation to secure arms limitation agreements than many Americans would think. Second, it is likely that Soviet interest in furthering détente, and belief that arms control agreements will contribute to it, will provide some further motivation for reaching agreements aside from military or economic benefits. My guess is that these considerations will not weigh heavily—the bloom of détente is presumably somewhat faded in the Soviet Union as in the United States—and that, therefore, arms control or disarmament agreements that are significant and mutually acceptable are not likely to be negotiable in the near future.

There is still one other possibility for constructive negotiations which, however, I view as even more remote: The political leadership in the two countries may come to believe that more is not better—that, in the strategic arms competition, we have a cancer on our hands; that is, a growth that can only cause us pain and expense, which may kill us, and which has no conceivable present benefit; and that the approach to negotiations relating to it should be as with international programs relating to disease control or eradication.

SUMMARY OF BELIEFS

In summary, I believe:

(a) that the first part of wisdom is not to kid ourselves into believing that Vladivostok accords were a triumph for arms control or that they are likely to be converted into one with the conclusion of a treaty based on them;

(b) that nevertheless, we should try to conclude a treaty expeditiously, partly because of the possibility of favorable effects on Soviet-American relations, and partly to minimize the adverse effects on our defense posture, and on our politics, of prolonged negotiations;

(c) that during these negotiations, and thereafter whether or not there are follow-on negotiations, the U.S. strategic posture should be based solely on what we believe we need for military purposes; that is, without reference to political perceptions or to strengthening our hand in negotiations.

I would reiterate that I believe we need less than we have and that a number of new programs are unnecessary and indeed ill-advised: Reflections of emphasis on one of the threats we face to the detriment of paying enough attention to some of the others—that of accident of miscalculation, that to our economy, and that of nuclear proliferation. I have mentioned a number of those programs earlier. I would conclude by observing that the administration's emphasis on increasing capabilities for using strategic weapons with flexibility; that is, on making "nuclear war fighting" more credible, is particularly unwise.

Thank you, Mr. Chairman.

Senator SYMINGTON. Thank you, Dr. Rathjens.

EFFICACY OF VLADIVOSTOK AGREEMENT

In a recent hearing before this subcommittee Ambassador Gerard Smith said the Vladivostok agreement is a good step forward. Today Secretary Nitze says he does not see much hope for this agreement; and Dr. Rathjens doesn't believe in the efficacy of the agreement, but for entirely different reasons.

Mr. NITZE. Well, I am not entirely without hope about negotiations with the Soviet Union. I have devoted 5 years of my life to exactly that task, and I wouldn't have done that had I not thought there was hope in the prospect of negotiating with the Soviet Union.

I do think that the ABM Treaty was an accomplishment. I think we are better off with the ABM Treaty than we would be without it. And that both the Soviet Union and we are. What I had hoped was that we would be able to get an agreement on offensive missiles which would be based on the same principles that the ABM Treaty was based on. Equality was one of the principles that governed the ABM Treaty. Another was that it contributed to stability of the nuclear relationship between us. It helped both of us, it seems to me.

Now, I do not believe that those are the principles which now have governed the offensive part of the negotiations. There was a misunderstanding, I think, between the two sides, at least as far as I was concerned, about the interim agreement. I had considered the interim agreement to be a short-term step which would give us negotiating time under which we could negotiate an offensive agreement based upon the same general principles as the ABM agreement. The interim agreement on its face said that it was not to prejudice the scope or terms of the long-term treaty which was to substitute for it. It was our view that if one could get the ABM problem out of the way, and if the offensive agreement was then negotiated in that framework and with a temporary freeze on additions to the numbers of offensive missiles, that this would be a good plan.

The Russians, however, seemed to have come away from the Moscow 1972 agreement thinking that most of the provisions of the Interim Agreement should be carried over into a long-term agreement. In fact, their original position was that all the provisions in the Interim

Agreement should be carried over into a permanent treaty. In other words, that the inequality of the numbers of launchers, the inequality in the permission to have MLBM's, all those things should be carried over into the permanent treaty. They also proposed that the French and British nuclear capabilities be counted as being on our side and that one should count forward based systems, and that one should control the B-1 and Trident deployments but not their new missile deployments. It was a wholly one-sided approach.

Now, the upshot of the further negotiations in the Vladivostok accord does not seem to me to do much for us.

Senator SYMINGTON. Thank you.

Dr. Rathjens, would you comment?

WEAPONS SPENDING'S ADVERSE ECONOMIC EFFECTS AND BADMOUTHING
U.S. POSITION

DR. RATHJENS. Yes, sir, Senator. I am concerned about the effect on our economy of spending a great deal of money in this area. I think the effects are adverse. I can't think of any kind of investment this country can make where the effects would be more troublesome in terms of the effect on the economy because we are not building up our capital plant, and the multiplier of effects are bad. Large expenditures on weapons, it seems to me, can only be highly inflationary at a time we can't afford it and will increase those deficits.

Having said this, I do concede there is probably some advantage in superiority or staying ahead or not getting too far behind, but I think it is small, and I think the extent of that advantage is in large measure in this area anyway, simply a function of what we say ourselves. If we keep bad mouthing our position, if the Secretary of Defense and the Secretary of State keep pointing out how perilous it would be if the Soviet Union had a superiority in throw-weight, or something like that—it can rebound to our disbenefit around the world to some extent.

Now, my concern about these negotiations is a reflection of my belief the Russians are hard bargainers. That means that if we are going to bargain effectively with them we are going to have bargaining chips, and the Secretary of Defense and Secretary of State are going to have to come up here on the Hill and exaggerate the importance of the Russian missiles and the Russian R. & D. programs and everything else in order to get support. Maybe we will get an agreement as a result. That is a possibility. But the two sure things that we can count on are these: One, our budget will go up; we will spend more on these programs than we would have had they not made those kinds of statements. I think this possibility is a little less troublesome with this Congress than it has been with some of those in the past, but there will be some such tendency. Two, the other sure effect is to exaggerate to the rest of the world the importance of nuclear weaponry and I think this is a bad thing. I think it is bad in terms of our international relations, as I think it is bad in terms of domestic politics.

So, considering the climate at this time in this country, our economic situation, and the fact that these strategic arms levels are now so high, it is my view that changes don't make any military difference. We really ought to just buy what we need, trusting the normal po-

litical process to determine what that is. We should rely on the normal debate between the executive branch and the Congress to determine what we need, without the process being distorted by claims from those who are concerned about the need for bargaining chips for negotiating purposes.

THEORY OF OVERKILL

Senator SYMINGTON. I would like to ask one more question. My time limit is almost up, so please be brief.

Mr. Secretary, do you believe there is anything in the theory of overkill?

Mr. NITZE. I do; but I think it has been grossly misstated most of the times that I have heard it discussed.

Senator CASE. I would be happy to yield as much time from mine as is necessary for a complete answer to this question.

Senator SYMINGTON. Of overkill?

Senator CASE. Yes.

Senator MCGOVERN. That is fine.

Mr. NITZE. It seems to me that the usual arguments about overkill discuss the inventory that the two sides have and particularly those that the United States has. It would seem to me to be more pertinent to discuss those weapons in inventory which could survive a first attack and which would then contribute to a deterrent by being survivable and having the capability to penetrate.

Second, it seems to me that when one looks at the programs that are under discussion by the Congress the interesting problem is the problem of 5, 10, 15 years from now, because no program which is authorized by the Congress is in fact going to be in place in less than 5, 10, 15 years.

I think the third problem with the usual overkill argument, the third assumption of the overkill argument, is that the strategy which we would choose in the event of an attack is to launch our deterrent forces against the other side's cities. I frankly think that that would be a prescription for universal destruction, certainly of the United States.

I would like to make one further point, that there is a problem when one talks about equivalence and says that one is prepared to live with substantially less than the other side. I referred in my statement to figures of a two or a three to one differential in throw-weight at the end of 10 years as being the prospect. I also referred to the concept of crisis instability. The whole point of the consideration of crisis instability, for instance, the situation which existed in the fifties, was that a small portion of the weapons on the attacker side could potentially take out a greater proportion of the weapons of the other side in the initial attack resulting in far greater disparities after the initial attack than existed before it. Everything we have done from the late fifties to the present time has been to try to assure that a situation would not arise in which the attacker could radically change the initial ratios by striking first.

I think it is a very unsound situation to let ourselves be in a position where we start off on a two to one ratio but we end up after initial attack in a 10 to 1 or 20 to 1 ratio against us.

I would agree with Dr. Rathjens that we ought to look at this problem from the standpoint of what we need, not from the standpoint of bargaining chips and things of that kind. When you look at it from the standpoint of what we need 5 or 10 years from now, I do not believe we have an overkill capability. I am concerned that we may have too little capability really to give us high quality deterrence and particularly to avoid the risk that the side striking first could significantly change the basic ratios.

Senator SYMINGTON. Thank you.

Dr. Rathjens.

OVERKILL CAPABILITY

DR. RATHJENS. I certainly believe there is something to overkill, and we have got a great deal of it, and the Soviet Union has a great deal, too. How much is scenario dependent? Secretary Nitze is quite right in noting that if one assumes an adversary attack the question is how much would be left after it had been absorbed, though there are other scenarios where that is not important. But even in that case, I think we have got overkill that is beyond all reason already, and we will be moving very much further in that direction if we go down the path on which we seem committed.

Let me just give you a couple of numbers to try to illustrate that point.

If I understand it correctly, when our present programs for MIRVing our missiles are completed, the land-based ones will include perhaps 20 or 25 percent of the number of warheads that we can deliver on the Soviet Union. Even if they were all knocked out in a preemptive attack, and I think it unlikely that they would be, we would still have left 75 or 80 percent of what we have, a large fraction of that in submarines and a large fraction in the bomber force. So I am not concerned about crisis stability to anywhere near the degree that I believe Secretary Nitze is. In fact, my view is that we are in an extraordinarily stable situation as regards crises, that it would be madness for either side to strike first, and that it will be that way for a long time. That being the case, we ought to take advantage of this situation and get rid of a lot of this weaponry we don't need.

There are another set of kind of scenarios that the Secretary of Defense keeps talking to us about. He talks about using nuclear weapons selectively in smaller number to take out a limited target system. I submit that we have an enormous overkill capability in that respect too. If we want to knock out 10 powerplants or something like that in the Soviet Union, I am sure we can do it. It would take a very small fraction of the strategic force we have. All of those scenarios, I would suggest, could be carried out with forces 20 percent of the size we now have.

I might say I don't approve of the direction he is proposing we move, but if one does give credence to those scenarios, I think we have overkill capability.

Senator SYMINGTON. Thank you.

Senator Case.

ASSUMPTIONS UNDERLYING STATEMENT REGARDING APPROXIMATE
EQUALITY OF BOMBER FORCES

Senator CASE. Mr. Nitze, would you tell us what your assumptions are when you state that in view of our lighter air defense, bomber forces are approximately equal? That is an interesting point and I think one that has not been made before us.

Mr. NITZE. The assumptions underlying that statement were that we would continue with the B-1 program, which it isn't certain that we will continue with. I was assuming that the Soviet side will continue with their Backfire program, and I would think that in the 10-year period they would have a large deployment of Backfires. I understand that they also have underway some kind of work on a bomber of the general class of the B-1—I think they are far from deployment yet. But I would assume further that the Soviets would maintain and improve their air defense capability—they have some 10,000 air-to-surface missile launchers today—and that they would continue to work on that with the high priority that they have put into it in the past. I further assume that we on the other hand will say with the decision which, as I said, goes back to the days when I was in the Pentagon, when we greatly cut down on our air defenses.

When you look at the net capability of both sides, taking into account prelaunch survivability, escape survivability and capability to penetrate. I would judge the two bomber forces will have approximately equal capability 10 years from now. I am not even sure that it wouldn't turn against us because I know that what unopposed bomber forces can do is enormous and that as air defenses have improved over the years the problem of penetration can become very great indeed.

There is further the point that in the discussions that are going on in Geneva, there is this confusion as to whether or not air-to-surface missiles are to be limited to 600 kilometers and whether this includes cruise missiles as well as ballistic missiles. I see no reason why you shouldn't limit or count air-to-surface ballistic missiles of a range greater than 600 kilometers. When it comes to cruise missiles, if the B-52's and B-1's are not permitted to have longer range cruise missiles. I have great doubts as to their penetration capability. I looked at a study by the Brookings Foundation the other day in which they were advocating an alternate program to the B-1 because they thought the B-1 was too expensive. But what they were talking about is a wide-bodied plane like the 747 or C-5 which would carry long-range cruise missiles. If the cruise missiles are effectively to be banned in the Vladivostok Agreement, of course, all those alternatives fall by the wayside.

I rather agree with George that one wouldn't be so concerned about very clearly increasing vulnerability of our Minuteman if one were to maintain high confidence for instance, in our bomber force, but in order to maintain high confidence in our bomber force I think it is necessary to go down the line of either the B-1 or of something like the alternative program, one or the other is necessary if you are going to maintain high confidence in your bomber force.

It isn't just a question of what weight a bomber can theoretically carry. The question is whether it can get to any useful target and be precise in hitting that target. I take very seriously the risk not only

to our Minuteman force but also to our bomber force. I for one would be for going about the business of being assured we had inland dispersed fields in order to increase the prelaunch survivability of our bomber force. I would also think it is important to go to the B-1, which is a harder plane than the B-52 and which, therefore, doesn't have to fly out as far to survive.

Now when you look at the SLBM component, there is a possibility that the great advantage we have had in the past where, for instance, the littoral around the Atlantic was largely in friendly hands, isn't necessarily going to continue with the Portuguese situation, things of that kind. We may in the future have different problems. I would put high priority on getting the Trident I missile. It isn't an easy job to make any new weapon system reliable so that you can have confidence in it. It takes real work to achieve reliability. In summary, I think we have a substantial task before us to assure the maintainance of high quality deterrence.

ECONOMIC CONSEQUENCES OF DEFENSE SPENDING

The other point that the chairman asked me about was the economic consequence. There is no doubt that every dollar that you have to spend for defense is a dollar that you can't spend for something else. But is defense, is the avoidance of a situation where there would be a temptation to somebody to strike us with nuclear weapons not a value? It would seem to me the Constitution is clear; one of the purposes laid down in the Preamble to the Constitution is to provide for the common defense. The idea that expenditures that are devoted to the common defense are somehow or other not productive, seems to me to have a bias in it which changes entirely the concept of our society, at least as I understand it, and changes the concept of the constitutional duty of the Congress and executive branch under the Constitution.

QUESTIONS OF ACTUAL AND POLITICAL VULNERABILITY

Senator CASE. These matters come down in broad terms, don't they, to two propositions. One is the broad question of the actual vulnerability, looking ahead, of our deterrent force, or the Russians' against us. The other question is what may appear to the world to be that vulnerability, and this concerns world opinion or how the world looks at the relative strengths of the Soviet Union and ourselves.

How important is the political side of vulnerability?

Mr. NITZE. Well, I quite agree that there are two levels of analysis, one of them is how one looks at it in an analytical sense as to what would happen in this scenario or that scenario, and the other is the broad public appreciation of the relative position of the two sides.

Let me first of all say on the analytical problem, I quite agree that it is not possible for anybody to be wholly precise about it because the possible scenarios are so many. And to project accurately is so difficult that there is an unavoidable degree of uncertainty in computing any of these things analytically. But as to broad, politically significant judgments I think there was no doubt, for instance, in the days when we had a nuclear monopoly, that we had a nuclear monopoly. I think there was no doubt in the fifties that there was a danger of instability, that the Soviet forces were on a small number of bomber fields, that

ours were on a small number of bomber fields and that the side striking first had a chance of taking out say 90 percent of the other side's forces in an initial attack. There wasn't any doubt in anybody's mind in the period after 1962, that the situation was both moving toward essential equivalence or parity. And of crisis stability. I think the world understood that and understands rough parity and crisis stability exists today.

I would worry about a situation where the underlying factors has changed in a gross sense because I do not believe that it is possible for us to kid ourselves. After all, we do talk. On balance I am all for speaking well of our strategic capability but we have seen before what happens when the executive branch overstates what the position is. There are bound to be people who will say that there is an overstatement if there is one. Frankly, George and I are amongst those who have from time to time said so when we have felt that the executive branch was overstating, for instance, the accomplishments of Moscow and Vladivostok. I firmly believe that they were overstating them, and I am sure that there are people who are going to say claims are overstated when they are overstated. Therefore, it is to my mind important to try to get the difference between what the executive branch says and what the facts are as small as possible. I think you run into grave dangers when the executive branch overstates the facts.

MEASUREMENT OF COMPARATIVE CAPABILITIES OF MISSILES

Senator McGovern. Dr. Rathjens and Secretary Nitze, I am sorry I wasn't here for your statements, but I read and appreciated both of them.

I know, Mr. Nitze, that you attach quite a bit of significance to the throw-weight factor. You say, for example, in your statement, that "To reduce the danger of nuclear war it would be more important to limit the throw-weight of the missile forces of both sides, particularly of the fixed ICBM forces, than to put a ceiling on the number of launchers."

Hasn't it been our position as a Government that just the reverse was true? We have attached more importance to accuracy and deliverability, ability to penetrate, than we have to the actual size of the warhead?

Mr. Nitze. I said earlier in the piece that the most useful measure—the most useful verifiable measure—of the comparable capabilities of missiles, in my view, was throw-weight.

With respect to accuracy, there is no doubt that accuracy can be a more important function even than throw-weight. But accuracy I believe not to be verifiably limitable. It is difficult enough for us to know what the accuracy of our own missiles is and it is almost impossible to have a very firm grasp on what the accuracy of the other side's missiles will be 5 years from now, 10 years from now, or even today. Thus, accuracy is not, I believe, a verifiably limitable characteristic of missiles. Throw-weight may not be precisely verifiable—you can't verify it with complete precision—but you can get a pretty good grasp on it. It is the capacity of a missile to lift weight into an intercontinental trajectory; that weight can then be used either for MIRVed packages or accuracy packages or for penetration aids or any of these other things. It is to

my mind by far the best measure of the relative capability of a missile booster. What you put on the end of that missile booster is not directly verifiable; you can put anything on it you want to.

Senator MCGOVERN. If what you say is true, that you can't verify accuracy on either side, with either heavy warheads or lighter warheads, the critical factor then becomes the number you have. You increase your striking power if you have additional launchers.

IMPORTANCE OF THROW-WEIGHT QUESTIONED

The Secretary of Defense in his annual report gave us figures with which I am sure you are familiar indicating that we have 8,500 separately deliverable warheads to the Soviet Union's 2,800. That seems to me to be an enormous amount on both sides when you consider the explosive power of these weapons. I suppose any one would have the capability of destroying a city. With that it is a little hard for me to understand that great importance that you attach to the throw-weight. It is my impression that when an explosion takes place, it is three dimensional. A lot of the danger is vertical rather than horizontal, so you don't get anywhere near double the target damage from two megatons over one megaton because of the characteristic of the explosion. Is that not true?

Mr. NITZE. Mr. Senator, the point that I would like to make is that what I have been most concerned about is the survivability of an adequate deterrent posture on our side, and if you are looking at the survivability of our deterrent posture, one of the things you look at is the survivability, for instance, of hardened fixed points such as our Minuteman silos. And with respect to hardened fixed points such as Minuteman silos, there it does make a difference as to what the size of the RV (reentry vehicle) is that is coming in. It is very hard to have high confidence that a small warhead will in fact be able to take out a hardened fixed silo. It is much more reliable to use one or two large weapons to take out a silo than it would be to use a number of smaller ones. There is also the question of the effect of one weapon exploding upon the other ones coming in. It is hard to have confidence in more than two going in at a given hard target. So that it does make an enormous difference whether those hard target killing RV's have a megaton or whether they have as our Poseidon missiles do, 40 kilotons, which is one-twenty-fifth thereof. It is almost inconceivable that you would use Poseidon warheads against hard fixed targets. It doesn't work out that way. Many, I think the great majority, of the 8,000 RV's that you talk about are in fact the Poseidon ones. I forget what percentage, but I think it would probably be 80 percent of the number of missile RV's you were talking about.

The bombers, of course, are an entirely different weapon system. The bombers take a long time to get from one continent to the other. They would not be the weapons that you would use in trying to take out the other fellow's deterrent forces. They, therefore, are a stabilizing force. I am for bombers because they are inherently a defense for the side being struck first. If you look at the various components of our deterrent forces one has to look beyond just these gross numbers, such as say 8,000 RV's. What kind of RV's, what can you do with them, under what scenario? You have to look at these problems.

ARMS AGREEMENTS' TENDENCY TO ESCALATE ARMS RACE

Senator McGOVERN. One of the things that worries me about the arms agreement is that each time we get into one, it raises some new problem that tends to escalate the arms race rather than slow it down. We didn't hear much talk prior to the SALT I agreement about throw-weight, but once an agreement on numbers was reached, we then began to talk about the necessity of building up the throw-weight. It seemed to set the stage for another escalation. If I read your statement correctly, the implication you draw on the basis of these earlier agreements is that we now need to begin building up the size of our warheads. It is not very hopeful as far as I am concerned in terms of any reductions.

Mr. NITZE. I wasn't trying to suggest that we necessarily would build up the size of our warheads to match theirs. All I am saying is that it is an important consideration which must be taken into account in looking at the relative capabilities of the two sides and in assessing whether or not we are going to be able to maintain a high quality deterrent and avoidance of nuclear war out through the next 10 years and beyond.

Senator McGOVERN. Senator Case has been good enough to yield to me so I could complete. I hope I can come back. I have some additional questions. If I may, I would like to submit two or three questions to both of you in writing, if I don't have an opportunity to come back.

Thank you, Mr. Chairman. Thank you Senator Case.

QUESTION OF LIMITING CRUISE MISSILES

Senator CASE. Mr. Nitze, on this matter of effectiveness of the bombers and the relationship of the cruise missiles to that effectiveness and your concern that an agreement would be made to curtail those missiles, is it proposed that 600 kilometer cruise missiles be included as part of the 2,400 total?

Does this trouble you and would it be bad to count these missiles as part of that number?

Mr. NITZE. The first comment is that I believe that it is the executive branch's position today that cruise missiles should not be limited to 600 kilometers and that this is under discussion in Geneva. I am not certain of that.

Senator CASE. I think that is probably true.

Mr. NITZE. I believe that to be the case.

Second, why is this an important question. I think that it is necessary. It has been for a long time considered to be necessary, in order to assist the penetration capability of the B-52's, to have in the first instance Hound Dogs and then improved Penetration Aids. Hound Dogs are long-range cruise missiles, longer than 600 kilometers.

Now, I believe that all the studies that I have seen indicate that the penetration capability of a bomber is greatly affected whether or not it can carry cruise missiles of a range greater than 600 kilometers. I think it is important and it contributes to the deterrent. I do not believe that the Russians conceive of us launching an initial attack with B-1's with SRAM's (short-range attack missile) and cruise missiles on them as part of an initial attack on the Soviet Union. This is not the kind of weapons system you would use for that purpose.

U.S. BOMBER SITUATION

Senator SYMINGTON. I personally cut the first order for the B-52's and the justification for them was that they could fly so high they were invulnerable. Today, the higher a plane flies, the more vulnerable it is. They came along with the B-70 after the B-52 and pretty soon the vulnerability was clear, as well as the incredible cost. The Secretary of Defense has already testified that the B-1 will cost a minimum of \$84 million apiece, and there are some studies out I understand, which if you include the \$3 billion of research and development you get a price of about \$140 million apiece, \$14 billion for 100 airplanes. The justification for the B-1 as against a bomber like the B-70 is that the B-1 could come in on the deck. Everything that came in on the deck in the '67 war was very successful. Six years later everything that came in on the deck during the Yom Kippur war was shot to pieces promptly. Consequently, much of the justification for the B-1 has now evaporated.

The great mistake we made in my opinion was canceling the Skybolt, for many different reasons, political reasons that involved France and Great Britain. What you are talking about now is the value of a launching platform. To get a launching platform for air-to-ground missiles—and this disturbs many of us who believe economy is part of national security—you are going to pay a high price. Already it is obvious that it will cost at least \$100 million apiece for a penetration bomber that is today considered less effective because of the great advancement in missiles. I submit that for your thoughts.

There is one statement I do take issue with from the standpoint of fact. I wish you would check it. You say the Soviet Backfire bomber is three times the plane in comparison with our FB-111. I don't think that is correct.

Mr. NITZE. I was using the gross takeoff weight of the two compared.

Senator SYMINGTON. Of course, we have a heavy fleet of tankers which can be utilized. I merely mentioned this to stress the bomber situation. It is one subject I do know a little bit about.

Mr. NITZE. I know you do.

Senator SYMINGTON. Thank you.

COMPARATIVE EFFECTIVENESS OF MISSILES AND BOMBERS

Senator CASE. You know so much about this that I would be very happy if you would intervene with any questions you might have.

I think my question now is whether this involves a calculation of each missile as a missile. Poseidon, for example, is considered as an equivalent to an intercontinental missile in a silo. Is there any reason to think of a missile coming from a platform of an airplane as a different thing? I just want to bring this out as a matter of what your thinking is about this. I take it you have a feeling that the reason the bombers are so effective is that they can survive.

Mr. NITZE. No; that they will be able to penetrate by virtue of the air-to-surface missiles that they can carry, and thus get close to the target and use their SRAM's, that is right. I think they can survive but it clearly isn't going to be 100 percent survivability and it isn't

going to be 100 percent penetration capability. To my mind the real issue comes down to the one as to whether or not we consider it to be important to the national defense to maintain a highly credible rent.

Senator CASE. Oh sure, there is no question about that and you can see that the Minuteman can contribute as well, but the degree of its contribution, I think, will go down as it becomes more vulnerable. In the latter instance, one might look to the bomber. Senator Symington has talked to the question of cost and difficulties of penetrating at low altitude. It is very difficult to penetrate at high altitude. I think if you put further inhibitions on its capability you then very much inhibit the capability of the bomber force to make a contribution. Then what are you left with? You are left with the SLBM and you are left with the possibility of mobile ICBM forces, either land mobile or, as Senator Symington said, air mobile.

ADVANTAGE OF AIR-TO-GROUND MISSILE LAUNCHING PLATFORM

Senator SYMINGTON. I think there is great advantage in having a launching platform for air-to-ground missiles. Of course, that advantage is increased by the range of the missile that is launched. And one of the sad aspects of cancellation of the Skybolt is that not only was it ballistic and Hound Dog is not, but it had a range twice as long as Hound Dog's. It would seem to me that instead of putting this incredible amount of money into a bomber which is only going to be justifiable if it can be successful over an extended period of enemy territory—and you have mentioned tremendous ground-to-air defense the Soviets have built—it would be better to concentrate on the launching platform, whether it is 747 or C-5, or something else of that character, or whether to spend money for rejuvenation or modernization of the B-52 itself.

Mr. NITZE. In order to make that launching platform effective it must be permitted for it to launch longer range missiles. Is that not right?

Senator SYMINGTON. Yes.

Mr. NITZE. Cruise missiles are not going to be themselves 100 percent survivable and in order to be able to penetrate you have to launch a lot of them because some of them are going to be shot down. You are trying to flood the defenses. So if you try to equate one cruise missile with, for instance, SS-18 missile, you really are comparing fleas and elephants.

Senator CASE. This is the point I wanted to have brought out.

Senator SYMINGTON. Getting back once more to the bomber situation, it seems to me that it is not important to dwell on the importance of penetration of the airplane itself in view of the ability of the airplane to launch air-to-ground ballistic missiles in the weapon setup.

It just occurred to me that when Dr. York testified before us he stated that some of the Triad would not have been built if we had known other weapons systems would have worked. As you know, I have been a tremendous advocate of the SLBM. Until we learn how to see through water I don't see how anybody is going to stop submarines moving around in the water successfully and, of course, they carry gigantic amounts of nuclear weapons on them, far more than has been thought of in the past.

CONSIDERATIONS AFFECTING RATIFICATION OF TREATY

Senator CASE. Would either of you think we ought to reject the treaty if it doesn't move in the direction that you have indicated, or if it does not include further limitation on throw-weight, for example?

Mr. NITZE. I have in mind two questions. One is whether the treaty includes bans on things which I would think would be important to maintaining in the long run future a high quality deterrence for the United States. If, for instance, it were to ban land mobiles and air mobiles or long range ballistic missiles dropped from aircraft, I would think then we are locking ourselves into a position where there is very little we can do in order to correct the growing survivability of our Minuteman. Under those circumstances I, for one, would not vote for ratification of that kind of a treaty but I would not want to call off the negotiations. I would be inclined to ask the executive branch to go back and negotiate some more.

With respect to the throw-weight limitation, there I think if it were possible to negotiate something along the lines of what I suggest in my statement, I think it would be a much better treaty for both sides. As I said, this is a very difficult negotiating task. If the treaty came back without those provisions in it I think I would probably vote for its approval, if it did not prevent the other things that I am talking about. But I would have no illusion that it was contributing much, if anything, to relieving the defense problem of the United States or contributing in the way an agreement of this kind should, to the maintenance of peace and the avoidance of nuclear war.

Senator CASE. Professor Rathjens, you have suggested something that has been increasingly concerning me for some time now, and that is the possibility that this process of trying to get an arms agreement might in itself have the unanticipated effect of entailing precedent arms build-up.

Would you vote against the treaty on that ground?

Dr. RATHJENS. No, not necessarily and probably not. My concern is that, to put it in a nutshell, I think we pay a heavy price during the negotiating process in order to get a treaty that may or may not be at the end of that process. Once you have paid the price, if the treaty is a reasonable one, one probably ought to vote for it. You have already paid the price. There are some kinds of agreement I think you would want to reject. If it turns out the only kind of deal that could be negotiated would be so asymmetric as to produce a very bad domestic reaction, then I would say vote against it. With respect to the kind of agreement we are talking about now, one based on Vladivostok, it seems to me that is about the only kind of consideration that there would be to recommend against supporting it. I think the levels that are likely to be reached and the loopholes that are likely to exist for both sides to exploit are going to be so large that it will not be effective as an arms control measure anyway; and if it is of any political utility to have it, why not? There will probably be some political disadvantage in rejecting it, so I would say vote for it if it is not going to cause too much domestic dissatisfaction.

NEED FOR EQUALITY IN THROW-WEIGHT

Senator CASE. I have one other question. I sense though you have a good deal of the same kind of feeling that Secretary Schlesinger has

as to the need to maintain a U.S. counterforce capability. Your argument as to the need for equality in throw-weight seems to emphasize the importance of being able to destroy hard targets. I wish you would expand upon this.

Mr. NITZE. It is undoubtedly a very difficult issue.

Senator CASE. I know it is.

Mr. NITZE. In my view it would be desirable for both sides if they are interested in avoiding a nuclear war between them, for neither of them to have the capability of destroying the ICBM silos of the other side to any substantial percentage. I mean any more than say 75 percent of them.

One can conceive of such kinds of armaments. Supposing both sides had 5,000 ICBM's each limited to 100 kilograms of throw-weight—in other words 240 pounds throw-weight for each missile. It is inconceivable that you could MIRV such a missile. It is also inconceivable that anybody could get 100-percent reliability in their missiles or that they could get 100-percent single shot kill probability with a missile of that size against the enemy's silos. It would then be inconceivable that either side could profit from trying to strike the silos of the other side. So that under those circumstances I think one would have a very stable relationship between the two sides. Under those circumstances it would not be intelligent for either side to strike the other side's ICBM's. That is not the situation when you have missiles of the size of the SS-18 with, say 15,000 to 16,000 pounds of throw-weight, which is 60 times the throw-weight for missiles in my illustration. So what I was suggesting was that one of the most useful ways of conducting these negotiations was to try to limit the size, limit the numbers of these large missiles and thus the quantity of this destabilizing excess throw-weight in the missile forces.

The other question, if we can't do that, is whether it would be wise for the United States to build something like their SS-19's, which are less than half the size of the SS-18. Whether that would be wise or not, I do not know. I think I would put it low down on the priority of things to do, but it is certainly something one would have to consider.

Senator CASE. The important thing is to maintain the deterrent?

Mr. NITZE. That is what I think.

Senator CASE. That is the basic objective. But it could be done through other ways, by mobiles, by all kinds of unorthodox weapon systems.

Mr. NITZE. I would put a higher priority upon seeing whether we can't devise and deploy a mobile system which wouldn't be vulnerable in the same way or to the same extent Minuteman silos are.

IMPORTANCE OF COUNTERFORCE CAPABILITY

Senator CASE. I wish you would comment on the general question.

Dr. RATHJENS. On the general question of high accuracy and being able to destroy the other fellow's silos?

Senator CASE. The importance of counterforce capability. I take it on the basic question that both of you consider that the most important thing is to retain a deterrent.

Dr. RATHJENS. Well, I think we have got more counterforce capability than we need and so do they.

Senator CASE. That means looking down the road.

Dr. RATHJENS. Looking down the road, it will get worse on both sides. The accuracy on both sides will likely improve. Yields will likely improve. And reliability will likely improve. All of this will mean that the vulnerability of any fixed hardened targets, silos or otherwise, will increase, and I think this is an unfortunate trend. There are ways that one can conceive of limiting it and some of us have thought at times that it might be interesting to try to put limits on testing, to restrict the number of flight tests that each side could have to say a dozen a year for missiles. That would go a long way toward limiting the attainment of higher reliability and higher accuracy. I would still favor that, if it didn't get bogged down in a long negotiating process with all of the troubles I mentioned earlier. I do not agree with the Secretary of Defense that we need a better hard target kill capability. I would oppose our going ahead with improved accuracy. I don't think we need that. I think we have more than we need now. And I would oppose our doing it no matter what the other side does. I think we have quite enough. I am not nearly as concerned about this first strike question as I think some other people are. I can't conceive of accuracies and reliabilities getting to the point where you can lay a weapon on the target and destroy it with 100-percent confidence. Even the possibility, however, somehow doesn't bother me very much because there are all of the submarines out there, and bombers, some of them are in Europe, as Senator Symington pointed out, so that it would be absolute madness, even if you could be assured of knocking out the other fellow's ICBM's 100 percent, to try this sort of thing.

Still, I think moving in this direction is unfortunate because it does raise fears in the minds of some people, it is likely to cause reaction on the other side; and I am particularly troubled about its effect on the rest of the world. It seems to me if we advertise that we are trying to develop weapons that can be delivered with such precision that they can knock out targets without any collateral damage to population, the message to the world is that we are trying to make these weapons useful for all sorts of contingencies, and that we are trying to make nuclear weapons a more useful instrument of power.

When we do that it does seem to me it provides the best possible rationale for anybody in any other country to argue in favor of acquiring nuclear weapons, too. "These Americans think they can use them selectively without escalation; they may use them against us; or in any case they think they are good because they are accurate, and so can be used to knock out military targets without destroying civilian population. Then everyone better have them." I think that is a terrible direction in which to be moving.

POSSIBILITY OF TOO MUCH FLEXIBILITY IN NUCLEAR CAPABILITY

Senator CASE. Of course, there is another possibility, and that is that people might be tempted to use nuclear capability for political objectives and as a substitute for conventional forces, either offensive

or defensive, or in response to aggressive action in areas around the world. I don't know if that is a factor in either of your thinking about this that we might have too much flexibility.

Dr. RATHJENS. It is a factor in my thinking and I think we have too much in some respects.

Senator CASE. I think it is an illusion myself, at least I suggest the possibility of it is an illusion. I can't imagine any small exchange of weapons which wouldn't result in what I think would be unacceptable casualties, absent a high degree of civilian defense, which I think would be unacceptable to all of us.

Dr. RATHJENS. I will comment on that. I can imagine such an exchange, but I don't think it is likely. My guess is that you are right, that escalation would occur and get out of hand. If so, there would be a large number of people killed and I wouldn't want to take that chance. So I would like to see us not move in the direction of trying to acquire that capability.

CIVIL DEFENSE PROBLEM

You mentioned the civil defense problem. I am troubled by it. If you want to minimize damage, if you want to play the game where you make nuclear weapons more useful—more credible instruments of power—the nuclear war fighting game—you probably do want a better civil defense capability. To get better civil defense capability you have to go out and beat the drum telling the American public they are in great peril and raising the spectre of all sorts of threats that may or may not exist. This is a bad direction in which to move. I don't think many Americans would be very eager to buy a substantial civil defense capability now, and I wouldn't myself, unless you scare them half to death. I don't want to see that happen. So I feel this would be a very unfortunate direction in which to move.

LACK OF CONTROL OVER WHAT THE OTHER SIDE DOES

Senator CASE. Mr. Nitze, do you have any comments on that general area? I know that you would rather talk more about the precise matter of weaponry, and I appreciate that, too.

Mr. NITZE. I guess the thing that worries me is that we don't have control over what the other side does, as is demonstrated by the difficulty of negotiating these agreements, that our values are not shared by the other side.

What concerns me is the differences in viewpoint between the two sides. I agree with George, that almost nobody in the United States wants to go into a heavy civil defense program. But, on the other hand, the Soviet Union does have a civil defense program and has a large civil defense program. Perhaps they have some difficulties with it; their public opinion may not be that enthusiastic about it; but they have it and they work hard at it. Second, with respect to the technological progress which makes it possible now to have cleaner weapons, much cleaner weapons than they used to be, where it is possible to have higher accuracy, where you could aspire to take out hardened points with airbursts as well as groundbursts, it is conceivable that one could mount an attack on our Minuteman silos which was bound to

have casualties but not bound to have the immense casualties which we used to contemplate would result from that kind of an attack. The question then at issue is what would we do in response to such an attack if it were to occur. As the ones who then have to decide whether to initiate an anti-city attack, I would think we would be much better off if we initiated an attack on other military targets than we would be in initiating an attack on cities. It would seem to me there is a difficult cutoff between the ability to take out other military targets and being sure that the other side isn't afraid that you are moving toward a capacity of taking out the fixed land-based portion of their deterrent. After all, the Soviet Union is moving in the direction where we have real concern about their ability to take out the fixed land-based portion of our deterrent. This leads to the question of the degree to which one can lead by unilateral actions. George suggests the thing for us to do is unilaterally do what we would hope that both would do. In the past I think we have been disappointed in those efforts.

I remember at the end of World War II when we thought that the threat to our security had been solely from Hitler and Japan, and they were both defeated. Why shouldn't we, under those circumstances, go into a radical demobilization. We went into the point system of demobilization and completely demobilized within a period of months. We couldn't even send a carrier task force up to Alaska in January 1946, as I remember, because we didn't have the experienced men that could run the ships. So certainly we led with complete demobilization. I don't think it followed that that was, therefore, the thing which others wanted to do. Certainly Stalin didn't think that was the appropriate thing for him to do. The idea that you are going to get reciprocity is just as apt to cut the other way. In fact, I think the real danger is that the other side might see opportunities opening which they didn't see before. So I have great difficulty with just looking at this thing unilaterally and doing unilaterally what we would like both sides to do.

Senator CASE. Thank you.

IMPROVING U.S. NATIONAL SECURITY

Senator SYMINGTON. Thank you. We have gotten pretty far into the philosophy of our own Government as against the philosophy of the Soviet Union. As you know, I have watched a lot of these gaps explode, like the bomber gap. This resulted in the United States building a tremendous amount of weapons we wouldn't have built if we had known the facts. The missile gap was the same way.

What we are talking about is something that could have a minimum effect in improving our national security compared to greater security derived from improving the economy. I want to see us have everything necessary for the security of the United States, but when you talk about this business of limited nuclear war, the distinction between a tactical nuclear war and a strategic nuclear war is difficult to perceive. As chairman of the Military Application Subcommittee of the Joint Atomic Energy Committee, I am astounded at the degree of overkill characteristic today of both sides. I doubt if a nuclear war could be held to, "You throw a three, I will throw a five, you throw a five and I will throw a seven." I don't think it will work that way.

A nuclear war would destroy civilization as we know it, and the danger of this occurring grows with the proliferation of nuclear arms. Six countries now possess nuclear arms; but only three have signed the Non-Proliferation Treaty.

It is no longer just a matter of what nuclear agreements we make with the Soviets. When there are 20 scorpions in the bottle you are going to have a problem regardless of what the 2 leading scorpions do.

I have some questions I would like to submit for the record for you and also for Dr. Rathjens. But there is one question I would like to ask at this time of you both.

RATIFICATION OF 1974 PROTOCOL TO ABM TREATY

Do you favor, Mr. Secretary, Senate ratification of the 1974 protocol to the treaty limiting antiballistic missile systems?

Mr. NITZE. I do.

Senator SYMINGTON. Dr. Rathjens?

Dr. RATHJENS. Yes, I do, too.

Senator SYMINGTON. Thank you both very much for giving us very constructive warnings on a subject which I think is the most important facing the world today. Certainly we will be in touch and look forward to getting further assistance and advice from you.

Mr. NITZE. Thank you.

Dr. RATHJENS. Thank you.

Senator SYMINGTON. Thank you very much.

[Whereupon, at 11:55 a.m., the subcommittee was adjourned, subject to the call of the Chair].

NON-PROLIFERATION ISSUES

FRIDAY, JULY 18, 1975

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, Biden, Case, and Javits.

Senator SYMINGTON. This hearing will come to order.

I have a short statement I would like to read.

WITNESSES

Before doing so, Mr. Porter, would you be good enough to identify the people you have with you—Hon. Dwight Porter, our prime witness, and his associate, Walter O. Enright.

Mr. PORTER. Yes, indeed, Senator.

To my left is Mr. Enright, whom you just mentioned, who is the manager of the area marketing for the Latin America Region of Westinghouse and Water Reactors Division.

To my right is A. L. Bethel, who is vice president and general manager of the Water Reactors Division.

Senator SYMINGTON. Thank you.

OPENING STATEMENT

This morning the Subcommittee on Arms Control, International Organizations and Security Agreements of the Senate Committee on Foreign Relations resumes its inquiry into the problem of nuclear proliferation—a problem of unparalleled importance for the future security of the world, for, if many more states, and possibly even sub-national groups, gain nuclear weapons, there will be no security for anyone, despite all efforts of the present nuclear weapons states to curb their arms race.

Yet, with the recent conclusion of an unprecedented multibillion dollar nuclear deal between West Germany and Brazil, efforts at curbing nuclear weapons proliferation have definitely been set back.

This accord marks the first time that any nation capable of supplying nuclear materials has agreed to provide another nation with a complete fuel cycle—in other words, with all the equipment, fuel and technology needed to develop nuclear weapons—and, moreover, the

recipient nation has refused to ratify the Non-Proliferation Treaty and, what is more, possesses extensive uranium deposits.

By the terms of this agreement, Brazil has consented to inspection procedures in accordance with the provisions of the International Atomic Energy Agency; but it is now clearly apparent that, if Brazil or any other nation which possesses a complete nuclear fuel cycle should decide to become a nuclear weapons power, there would be nothing the Agency could do to prevent such a development. It has no powers of either prevention or enforcement.

What this subcommittee seeks to examine this morning are certain background aspects of the German-Brazilian accord, which, as we understand, first involved negotiations between Brazil and the Westinghouse Electric Corp. and, only later, companies in West Germany.

The subcommittee also notes that last month the Department of State testified that the United States had tried to stop West Germany from concluding this potentially dangerous accord with Brazil, but could not succeed. Yet, later the same month, the Chancellor of West Germany stated at a news conference in Bonn that the American Government "has not expressed a word of criticism to us."

In that connection, we will have Government witnesses later to clear this matter up.

This morning's testimony should help us in understanding the position of the Westinghouse Corp. during the early negotiations relating to Brazil's purchase of a full nuclear fuel cycle. We shall also examine developments in the nuclear field related to the Common Market's reported turn to the Soviet Union for enriched uranium which it has in the past purchased almost exclusively from the United States.

We now welcome the Honorable Dwight Porter and his associates.

Mr. Porter is director of the International Government Affairs Division of Westinghouse, and is the former U.S. permanent representative to the International Atomic Energy Agency in Vienna.

Mr. Porter, have you a prepared statement?

STATEMENT OF DWIGHT PORTER, DIRECTOR OF INTERNATIONAL GOVERNMENT AFFAIRS DIVISION OF WESTINGHOUSE CORP.; ACCOMPANIED BY WALTER O. ENRIGHT, MANAGER OF AREA MARKETING, LATIN AMERICA REGION, WESTINGHOUSE CORP.; AND A. L. BETHEL, VICE PRESIDENT AND GENERAL MANAGER, WATER REACTORS DIVISION, WESTINGHOUSE CORP.

Mr. PORTER. Senator, I have a prepared statement with respect to the Brazil nuclear negotiations.

Senator SYMINGTON. Would you read it?

Mr. PORTER. Thank you, sir.

BACKGROUND OF WESTINGHOUSE /BRAZIL NEGOTIATIONS

Westinghouse in international bidding competition sold in 1971 the first nuclear electric generating station in Brazil to the utility—Furnas Centrais Electricas. The plant, known as Angra dos Reis, is a Westinghouse pressurized water reactor—PWR—generating approximately 620 megawatts electrical, and is scheduled for operation in 1977-78.

As a result of the sale of the first nuclear plant, and the implementation of that project, Westinghouse had established good relationships with the utility and the National Commission for Nuclear Energy—CNEN—as well as its subsidiary CBTN, whose purpose was the development of the nuclear fuel cycle.

In 1973, CBTN had developed an essential information booklet that described a large nuclear program to be undertaken in the country during the remainder of the century. This program, starting slowly with about one plant a year coming on line in the 1980's, would ultimately grow in proportion during the 1990's so that an estimated 70,000 megawatts electrical of nuclear generation would be operating by the year 2000.

In the development of the nuclear fuel cycle, CBTN has as its first objective, the development of fuel fabrication capability in Brazil, followed by the capability to perform conversion of yellowcake to UF₆ and to oxide. Capability for reprocessing and enrichment were also foreseen as eventual developments.

Brazil has expressed its intention to develop to the maximum extent its capacity to build nuclear powerplant equipment domestically and to perform nuclear plant engineering and design. Westinghouse was encouraged to consider engineering licensing, and investment in Brazilian industry to help with the development of native capability, which I described earlier, and it was stated that the supplier who was prepared to undertake the most comprehensive programs of this nature would be the one chosen to build future nuclear plants.

We had previously had a long connection in the country by virtue of building the first plants.

WESTINGHOUSE'S DISCUSSION WITH BRAZIL

Westinghouse entered into discussion with Brazil late in 1973, and offered a proposed program in June 1974, which encompassed the establishment of a nuclear engineering company in Brazil, licensing of fuel fabrication and nuclear plant equipment technology, and management assistance in the development of a heavy component manufacturing facility.

Assistance to other private industrial firms interested in the nuclear business was also proposed. And those discussions had been proceeding along these lines for several months.

In July 1974, following the signing of a contract by Brazil in June for enrichment services from the United States for 2,400 megawatts electrical of new nuclear generation, the United States returned the deposit made by Brazil as required by this contract, and advised Brazil that the contract was conditional, while at the same time retaining contracts with certain other countries as firm. The reason for this action is understood to be that the U.S. Government could not legally accept firm contracts for enrichment beyond the capacity of the existing enrichment facilities. This action in the case of Brazil, had a profound effect on the course of the nuclear program conceived by Brazil, and led to the advancement of Brazil's timetable for achievement of its own enrichment capability.

Although previously, natural uranium reactors of the Canadian type, as adopted by Argentina, were considered as an alternative to

the pressurized light water reactor for use in Brazil, by this point in time Brazil had essentially chosen the PWR as the type that would be employed. However, renewed studies of the Candu reactor were undertaken and, a request was made that uranium enrichment projects be offered in Brazil. Westinghouse, at that time—although no longer—a participant in UEA, proposed that Brazil consider, as had Japan, the undertaking of an equity position in the enrichment plant being studied by UEA for construction in the United States.

Around August 1974, it was learned that discussions between the German and Brazilian Governments were taking place on a broad scope of nuclear cooperation including enrichment and reprocessing technology.

Although multiple meetings between Westinghouse and individuals in Brazil were held subsequently, no substantive progress was made and it became increasingly obvious that unless some solution to Brazil's concern for enrichment could be found, that they were not going to consider Westinghouse offers.

We understand that there was correspondence from U.S. participants in Uranium Enrichment Associates—UEA—to the Brazilian Government in early Spring 1975, with respect to possible Brazilian participation in the UEA enrichment program.

We also understand that subsequent communication of the U.S. Government to Brazil made clear that there was no near term possibility for the construction of an enrichment plant in Brazil.

In Westinghouse's view, it was also clear that the Government of Brazil felt itself unable to conclude that U.S. Government would be a reliable supplier of enrichment services.

That is my prepared statement, Senator.

Senator SYMINGTON. Thank you, Ambassador Porter.

URANIUM ENRICHMENT ASSOCIATES

That Uranium Enrichment Associates you referred to, is the uranium enrichment venture the administration is pushing; is it not?

Mr. PORTER. Yes, sir. It is the organization which is mentioned in the President's recent proposals to the Congress for the building of a fourth enrichment plant.

HOW WESTINGHOUSE LOST OUT

Senator SYMINGTON. It is apparent from the article by Bowen Northrup in the July 2, 1975, edition of the Wall Street Journal that Westinghouse had been engaged for months in negotiations with the Government of Brazil for a major sale of nuclear reactors.

From that article it is also apparent that Westinghouse did not make that sale due, in part, and I quote, to "a position by the U.S. Government that was considered negative by the Brazilians and they, the Brazilians, turned the whole process off."

I ask unanimous consent that this article be inserted at this point in the record.

[The information referred to follows:]

[From the Wall Street Journal, July 2, 1975]

UNCHAINED ATOM? NUCLEAR-PLANT GROWTH AROUSING GLOBAL FEARS OF SPREADING WEAPONS; WEST GERMAN PACKAGE GIVES BRAZIL KNOW-HOW THAT MIGHT LEAD TO BOMB

HOW WESTINGHOUSE LOST OUT

(By Bowen Northrup)

LONDON—A few days ago diplomats from eight countries held a meeting here that was so secret they declined to give details of the meeting's schedule, what was discussed or even the names of those attending. One breach of the tight security and some of the participants would have pulled out.

That isn't to be risked, because the diplomats were meeting on a subject that desperately requires harmony of purpose: regulating the spread of nuclear power technology that could ultimately lead to the spread of atomic weapons.

The diplomats represented the eight countries that have nuclear technology to export: the U.S., the Soviet Union, Britain, France, Canada, West Germany, Japan and Italy. Their goal is to set up firm ground rules for the strict control of all nuclear technology and materials sold to other nations.

The issue has quite suddenly come to a head because of West Germany's agreement, signed in Bonn last week, to sell Brazil a nuclear "package" that is one of the biggest transactions of the nuclear age. It's worth at least \$4 billion and perhaps double that. As part of the package, over the next 15 years the Germans will be selling the Brazilians not only power plants but also the know-how for making their own nuclear fuel, either from uranium or plutonium. Unfortunately this same fuel technology can also be turned away from the peaceful atom of nuclear power to the deadly atom of nuclear weaponry.

An Urgent Issue

It's even more unfortunate that Brazil, like several other nuclear aspirants, hasn't signed the Nuclear Nonproliferation Treaty by which non-nuclear nations are prohibited from making nuclear explosives and agree to submit to international inspection of nuclear facilities. "The proliferation of nuclear weapons is now a more urgent issue than at any time in the past decade," says John Maddox, a British scholar at the International Institute for Strategic Studies in London.

Nuclear technology is hardly a mystery any more. Nuclear plants are available from a number of manufacturers; the processes for turning uranium into nuclear fuel are well known and the chemical extraction of plutonium from used nuclear fuel is almost basic technology. Put together as a package they would give a developing nation a degree of energy independence that the forces of nationalism are coming to demand.

The critical question is will these countries use this technology for energy or weapons production? And will the companies that sell them the technology take steps to ensure its peaceful use?

There are 426 reactors planned or operating in 38 nations outside the U.S. Frank Barnaby, director of the International Peace Research Institute in Stockholm, says: "Any spread of nuclear technology is serious without a corresponding indication that countries will give up that part of their sovereignty that is required to put the technology under international control."

South Korean Warning

That indication simply isn't there with many of nuclear energy's new customers. France, for example, is discussing the building of a massive, multibillion-dollar nuclear fuel factory in Iran. Neither country has signed the nonproliferation treaty. Neither has Argentina, which is buying nuclear plants from Canada.

South Korea, which has signed the treaty, is also buying plants from Canada is rumored to be negotiating for a French plutonium-processing plant. Recently, despite the treaty, President Park Chung Hee warned that South Korea might have to develop its own arsenal of nuclear weapons if the U.S. nuclear umbrella fails.

The danger that power-plant sales can indeed lead to the development of nuclear explosives was clearly demonstrated last year when India set off a device made from plutonium extracted from a research reactor supplied by Canada. India said the device was developed only for peaceful purposes.

The concern of the nuclear superpowers, the U.S. and the Soviet Union, is that the manufacturers of nuclear equipment might be a little too eager to sell their technology. European companies particularly need the business because they have limited domestic markets. Mr. Maddox says there is a major threat posed by "the degree to which the commercial interests of the nuclear industry will erode the (nonproliferation) treaty."

Some U.S. nuclear sources believe that West Germany made certain concessions to the Brazilians over the future control of its technology in order to win the massive contract. "It's too bad that the West Germans are willing to give away this technology so easily," says Jarvis Cotton, manager of international marketing for Westinghouse Electric.

A Chill in Washington

Perhaps his bitterness can be excused because originally the Brazilians went to Westinghouse for the contract. The Brazilian government was seeking as many as eight nuclear power plants from Westinghouse plus U.S. government export licenses for nuclear-fuel and plutonium-processing technology.

This doesn't mean that Brazil will then have the stuff of bombs, because nuclear devices need almost solid uranium-235. But, nuclear experts say, the nozzle technique could be adapted for producing bomb-grade uranium.

There is another source of weapons material: plutonium. This "man-made" radio-active metal is a by-product of the nuclear reaction inside the reactor. But it can only be obtained by removing the used uranium fuel from the reactor and running it through a chemical extraction plant.

Because plutonium is an ideal fuel for nuclear reactors and, of course, means that less uranium has to be used, it's expected that plutonium plants are going to provide a brisk business for manufacturers some time in the future. (At present there are only a handful of commercial plutonium plants around the world and none operating in the U.S.)

This means that plutonium is likely to be plentiful. The Stockholm peace research institute believes the situation is already dangerously advanced. It calculates that by 1983, 80 tons of bomb-grade plutonium will be "available." Of this, one-third will be in the hands of nations that haven't signed the nonproliferation treaty—or enough to make about 50 bombs of "nominal" size.

There's also a problem with plutonium plants that needs to be tackled by the exporting countries. Engineers call it "material unaccounted for," or the plutonium that gets "lost" in a plant's intricate system of pipes or that sticks to fuel canisters. It can amount to 3% or 5% of a plant's plutonium production, and Mr. Maddox believes these safeguards are unsatisfactory.

Clearly Bonn is hoping that such problems will be resolved by the time the re-processing plant is delivered to Brazil six years or so from now. And to those who are nervous about the prospect, a Bonn official emphasizes. "There will be no export licenses issued unless complete safeguards are assured."

"The problem is the treaties and inspection techniques," says A. L. Natwick, an international specialist at General Electric. An official of another company says one obvious goal for the eight nations is to "bring France into the system of backing adequate safeguards." Another goal is to agree to controls on the transfer of technology and know-how as well as equipment and materials.

Even with these stringent controls, Mr. Maddox, the British scholar, warns that the Brazilians could comply with the letter of the agreement but build their own weapons-producing installation through a long-term "parallel initiative effort." The German transaction, he declares, "will obviously make it easier for Brazil at some future stage to build an unsafeguarded device."

Plenty of Uranium

A look at the West German technology that's to be exported shows how this might be done. First the nuclear plants themselves will be built by Kraftwerk Union AG, a joint venture of Siemens and AEG-Telefunken. The company has firm commitments for two 1.3-million-kilowatt power stations, and the Brazilians have taken an option for six more.

Brazil, which is generally a resource-poor nation, does have abundant deposits of uranium (and, in deed, part of the agreement calls for Brazil to export uranium to West Germany as partial payment). But to turn the uranium into fuel for the nuclear plants, Brazil must build a plant to enrich the metal.

Kraftwerk Union's so-called light-water reactors use uranium fuel in which the fissionable isotope uranium-235, which is only 0.7% of natural uranium, is increased to about 5%. In the U.S. this is done by "filtering" gasified uranium through miles of tubing. Another process, being developed both by the U.S. and a West German-Dutch-British consortium, concentrates the uranium-235 by whirling the gasified uranium in a centrifuge.

The only totally West German technology available for export is the "jet nozzle" process, which since 1970 has been under development by the STEAG combine in Essen. STEAG will build its first pilot plant in Brazil by 1981 and will follow this with a commercial plant. The process requires enormous amounts of electricity, which Brazil could provide with hydroelectric power.

A Man-Made Fuel

The problem is that most of the non-Communist world's nuclear fuel, or enriched uranium as it's called, is made in three massive U.S. government-owned plants that were originally built for the weapons program. Washington is only now planning for the transfer of this technology to U.S. industry and is firmly opposed to its exportation. There is also opposition to the spread of plutonium-processing technology.

"For the Brazilians it's was simple, for us it was complicated," says Mr. Cotton. "At some critical stage the U.S. government took a position that was considered negative by the Brazilians and they (the Brazilians) turned the whole process off." Mr. Cotton doesn't know precisely what offended the Brazilians: "I only know that a chill developed."

Washington's stiff attitude to selling nuclear technology in a package recently was expressed by Sen. John Sparkman, chairman of the Senate Foreign Relations Committee, who called the situation "appalling." It's known that Washington has expressed its displeasure to Bonn over the transaction.

The West Germans privately dismiss all this talk as commercial sour grapes. They have negotiated safeguards with the Brazilians in conjunction with the International Atomic Energy agency in Vienna that in some respects "go beyond" the nonproliferation treaty, says an official in Bonn.

A Scramble for Business

The Germans make another point. "Other countries would have sold them (the Brazilians) the system if West Germany hadn't," according to the Bonn official.

The scramble for business, warns Mr. Cotton, is going to put the five U.S. reactor manufacturers at a disadvantage if Washington continues to take a "hard line" position.

There are, he says, between 50 and 75 million-kilowatt nuclear plants coming up for bids around the world over the next five year or so. Some of these, he says, will only go to those companies that can offer package deals of nuclear plants plus uranium and plutonium technology.

That is why the eight nations that export nuclear technology are meeting in London. They are desperately trying to set up a code before the nuclear-sales race gets out of hand.

FIRST DISCUSSION OF PROSPECTIVE WESTINGHOUSE SALE

Senator SYMINGTON. We would be interested in knowing some facts about what actually went on. You have reviewed briefly the chronology from the time the Westinghouse-Brazilians began negotiations until Brazil terminated these negotiations.

Just for the record, and I will be brief in asking these questions and I would appreciate your answers being as short as possible, when was the prospective sale first discussed between Westinghouse and Brazil?

Mr. ENRIGHT. There was no specific date that could be identified as the beginning of negotiations.

Senator SYMINGTON. You go back and look at your records, and give us an estimated date, would you please?

Mr. ENRIGHT. Yes. There were discussions on a more or less continuous basis from the time of the first nuclear plan contract in 1971.

In the latter part of 1973 it became apparent to Westinghouse that Brazil would proceed with the purchase of additional nuclear plants beginning in 1974.

Senator SYMINGTON. Thank you.

PROPOSED BRAZILIAN NUCLEAR PROGRAM

We would like to know how many, what kind, what size, and on what scale did the Brazilians propose to buy reactors from Westinghouse?

Would you supply that for the record?

Mr. PORTER. Yes, sir.

[The information follows:]

PROPOSED BRAZILIAN REACTOR PURCHASE FROM WESTINGHOUSE

Brazil identified a program for up to 8 nuclear plants with capacities in the 1550-1300 MWe range to be constructed for operation between 1982 and 1990. Fabrication of nuclear fuel assemblies under a license arrangement was also under discussion.

Brazil's approach was to emphasize the start of nuclear plant equipment engineering and manufacturing in connection with the forthcoming plant purchases. Through discussions it was concluded that a commitment for a number of plants would be necessary for initiation of Brazilian manufacturing and engineering on a viable economic basis.

Brazil did not press for other elements of the nuclear fuel cycle until after its contract with the U.S. Government for enrichment services for new plants was made conditional.

Senator SYMINGTON. Therefore, Brazil did request Westinghouse to supply other elements of nuclear fuel cycle such as a reprocessing plant or enrichment plants.

Mr. PORTER. Yes.

U.S. GOVERNMENT INVOLVEMENT IN DISCUSSIONS

Senator SYMINGTON. When did the U.S. Government first become involved in the discussions?

Would you supply that for the record?

Mr. PORTER. Yes, sir.

[The information referred to follows:]

U.S. GOVERNMENT INVOLVEMENT IN WESTINGHOUSE-BRAZIL DISCUSSIONS

It is Westinghouse practice to keep the U.S. Government advised of its nuclear marketing activities outside the U.S. The U.S. Consulate in Rio had been aware of and informed of Westinghouse discussions with Brazil on a continuing basis. The U.S. Government also became involved through direct dealings with the Government of Brazil relating to enrichment services and related discussions pertaining to renegotiations of the bilateral U.S./Brazilian Nuclear Cooperation agreement.

Westinghouse also discussed the Brazilian negotiation and Brazil's request for resolution of the enrichment problem with the State Department and the USAEC/ERDA/NRC.

Senator SYMINGTON. What agency was involved?

Mr. PORTER. In that case, Senator, we probably cannot be specific. Certainly the agencies of direct concern were the State Department, the then AEC, and, of course, most of the communications were transmitted in formal diplomatic channels through our diplomatic mission in Brazil.

GERMAN GOVERNMENT'S ACCEPTANCE OF ARRANGEMENT U.S.
GOVERNMENT TURNED DOWN

Senator SYMINGTON. We have testimony from the State Department that is flatly denied by the German Government.

I think it is fair to say that the United States has put not less than \$200 billion into the defense of Europe since World War II, which is primarily, as we know, from the standpoint of location, money involved and so forth, the German people. Thus it is difficult for us to understand why the United States would turn down an arrangement and then the German Government would accept the same arrangement, especially when this Government turned it down because it felt there would automatically be proliferation of nuclear weaponry. With the uranium enrichment plant and with a lot of uranium of its own, Brazil could become a nuclear power.

These are some of the thoughts that run through our minds as we ask these questions.

Were you told by this Government why they did not want you to proceed with the Brazilian arrangement? Have you covered that?

Mr. PORTER. I think that was covered, sir.

Really, it relates primarily to the problem of enrichment services.

CONVEYANCE OF U.S. POSITION

Senator SYMINGTON. I presume Mr. Enright would know this.

What agencies gave the position of the United States?

Mr. ENRIGHT. I believe that the position of the United States was conveyed to Brazil relating to enrichment through the Embassy, through the Ambassador.

Senator SYMINGTON. Through the State Department?

Mr. ENRIGHT. Yes, sir.

Senator SYMINGTON. Was it in writing or was it verbal?

Mr. ENRIGHT. I do not know the answer to that, Senator.

Senator SYMINGTON. How did you find out about it?

Mr. ENRIGHT. Through our communications with State Department and Embassy people, both here in Washington and in Brazil.

Senator SYMINGTON. Did the State Department tell you that your deal with Brazil was off, or did the Brazilians tell you your deal with Brazil was off?

Mr. ENRIGHT. I think we received that message from both places.

Senator SYMINGTON. At the same time?

Mr. ENRIGHT. Approximately the same time.

Senator SYMINGTON. Which one first?

Mr. ENRIGHT. I cannot say.

Senator SYMINGTON. Would you supply that for the record?

Mr. ENRIGHT. Sure.

Senator SYMINGTON. And whether or not it was in writing and, if so, who signed it, and if it was verbal.

Any records that you have that show it.

[The information follows:]

CALLING OFF OF WESTINGHOUSE/BRAZIL DEAL

Following Brazil's signing of a contract with the U.S. Government and making a cash deposit as required by that contract for receipt from the U.S. of uranium enrichment services, the U.S. Government advised Brazil in July 1974 that the

contract was "conditional" and returned its deposit. It is believed that this was done by written correspondence to the Government of Brazil from the U.S. State Department. It is understood that this position was taken as a result of the U.S. Government having "oversold" its existing enrichment capacity. The position was conveyed officially by the U.S. Government to the Government of Brazil, and Westinghouse was not specifically advised of this action. Brazil had been required to conclude the contract in question before the deadline date of June 30, 1974, and Westinghouse had confirmed with both the USAEC/ERDA, and Brazil that this had been done.

The Brazilian Government did not formally notify Westinghouse that the deal was off. On the other hand, Brazil had never *formally* initiated a negotiation. However, in April 1975, in discussions with both the U.S. Consulate and representatives of the Government of Brazil, it was learned that Brazil intended to conclude an agreement with Germany, and that since Westinghouse could not address the enrichment requirement, its offers were not being given further consideration.

DID WESTINGHOUSE TAKE RECLAMATION ACTION?

Senator SYMINGTON. Did Westinghouse take any reclamation action with the U.S. Government or Brazilian Government following this statement of the U.S. position?

Mr. PORTER. Senator, I was not with Westinghouse then but I made the same inquiry myself. Obviously Westinghouse was unhappy to lose this business and obviously Westinghouse expressed its concerns.

Senator SYMINGTON. I undertand that.

I am just asking—

Mr. PORTER. But, we accept the rules of the game as laid down by our Government in these export sales and obviously we were not in a position to question them.

[The following information was subsequently supplied:]

Westinghouse attempted to persuade Brazil of the sincerity of the expressed U.S. Government longer-term intention to fulfill its commitments as a reliable supplier of uranium enrichment services to other nations.

Westinghouse also discussed with the U.S. Consulate, the State Department, and USAEC/ERDA, the negative reaction of Brazil to the conditional contract, and tried to explore solutions to the problem.

JOBS INVOLVED IN PROPOSED SALE

Senator SYMINGTON. One of these articles says the amount of money involved was between \$4 and \$8 billion, and presumably that meant a lot of jobs were involved; is that correct?

Mr. PORTER. A great many jobs.

Senator SYMINGTON. What is the estimate, Mr. Enright? Do you want to answer that?

Mr. PORTER. Could I ask Mr. Bethel?

Senator SYMINGTON. Would you identify yourself?

Mr. BETHEL. Yes; I am Albert L. Bethel, vice president of Westinghouse, general manager of our water reactors division, which has responsibility for the Westinghouse pressurized water-reactor business all around the world.

In approximate numbers, for each reactor sale there are about 750 jobs involved for each year of approximately 5 or 6 years that that project is in being.

There are multipliers that can be put on to that. We buy a certain amount, a great amount of steel. We buy a great amount of components, so that one could easily put a multiplier of approximately three

for the additional industrial jobs that are created outside of Westinghouse.

Senator SYMINGTON. How many reactors were involved?

Mr. BETHEL. At the time of this negotiation we were thinking of an initial program of about eight reactors.

Senator SYMINGTON. That would be around 16,000 to 20,000 jobs?

Mr. BETHEL. That is right.

Senator SYMINGTON. Is that right?

Mr. BETHEL. Yes, sir.

Senator SYMINGTON. Did our Government not consider that important? The only source of tax is income, including profits.

Mr. BETHEL. I am sure the Government considers it important, but they have to rank their priorities of importance to various factors.

FIRST KNOWLEDGE OF PROPOSED GERMANY-BRAZIL DEAL

Senator SYMINGTON. When did you learn of the proposed deal between the Federal Republic of Germany and Brazil—after you had been turned down?

Mr. PORTER. It was late summer of last year that we learned discussions were taking place. June 1975 nuclear supplier nations meeting.

Senator SYMINGTON. It was reported by Marilyn Berger, in the June 19, 1975, edition of the Washington Post, that eight nuclear supplier nations met in London on June 19 and 20, 1975—that would be last month—quote, “to develop new safeguards to prevent purchasers from diverting technology meant for peaceful purposes to the development of nuclear weapons.”

I ask unanimous consent that Miss Berger’s entire article be inserted at this point in the record.

[The information referred to follows:]

[From the Washington Post, June 20, 1975]

NUCLEAR PARLEY ENDS

LONDON—Officials from several countries that produce nuclear power plants concluded a two-day secret meeting on ways of stopping the spread of technology that could be used to produce bombs, a British spokesman acknowledged. He would not say who attended, but reports from Washington said the United States, Soviet Union, Britain, France, Canada, Japan and Italy attended.

[From the Washington Post, June 19, 1975]

8 NATIONS MEETING ON A-EXPORTS

(By Marilyn Berger)

The eight major exporters of nuclear power plants and components are meeting in London to develop new safeguards to prevent purchasers from diverting technology meant for peaceful purposes to the development of nuclear weapons.

The meeting, which is surrounded by unusual secrecy, started yesterday and was to continue today. Even the list of countries attending was not announced, but diplomats of several of the nations represented said the United States, the Soviet Union, Britain, France, Canada, West Germany, Japan and Italy are participating.

The goal is to draw up a convention that would pledge these countries—and, potentially, others who may become major exporters in the future—to place stringent controls on equipment and material sold to other nations.

There has been growing concern that non-nuclear countries will divert material from nuclear power reactors—which are being sold all over the world—to build bombs.

West Germany recently contracted to sell Brazil a full nuclear fuel cycle, including a uranium enrichment plant and a reprocessing plant that can separate plutonium from spent fuel. Both enriched uranium and plutonium can be used to produce nuclear bombs. France is also negotiating sale of reprocessing plants in South Korea and Pakistan.

Neither Brazil nor Pakistan has signed the Non-Proliferation Treaty, which would pledge them not to produce nuclear weapons.

In a speech to the United Nations last September, Secretary of State Henry A. Kissinger alluded to the concern that exporters in their competitive zeal to make a sale, would fail to insist on appropriate safeguards.

Kissinger said then that, "The United States will shortly offer specific proposals to strengthen safeguards to the other principal supplier countries."

The London meeting is the second following up on this suggestion. The first was in April.

The United States has developed new instrumentation that can monitor the amount of plutonium present in a reactor and thereby determine whether it has been tampered with.

The conferees were expected to discuss requiring the use of such monitoring equipment in conjunction with reactor sales as well as questions of whether to demand additional pledges from purchasing countries not to divert material to nuclear weapons development.

U.S. officials are worried that the disclosure of the meeting might be embarrassing to some countries, forcing them to drop out of the negotiations.

The participants are vulnerable to accusations that they are ganging up on non-nuclear states to impose controls not only on nuclear weapons but on peaceful facilities.

Meanwhile, Sen. Walter F. Mondale (D-Minn.) introduced a resolution yesterday expressing the opposition of the Senate to the sale of atomic power plants by West Germany and France which would give the purchasing countries the ability to produce atomic weapons.

"This danger is two-fold. The first is that the purchasing country might divert plutonium from such plants to develop nuclear bombs. The second is that proper safeguards have never been devised to prevent the theft of plutonium from commercial plants by terrorist or criminal elements," he said.

Senator SYMINGTON. Since you are a major supplier of nuclear equipment, were you consulted by the U.S. Government prior to this conference? Were your views sought in any way on the issues to be discussed?

Mr. PORTER. Not to the best of my knowledge, sir.

As the article suggests, these talks have been held in secrecy between the representatives of the principal nuclear supplier governments and we were not consulted.

REACTORS TO BE BUILT FOR SALE TO BRAZIL

Senator SYMINGTON. According to news reports, the West German firm providing Brazil reactors is Kraftwerk Union AG—apparently a joint venture of Siemens and AEG-Telefunken.

Does Westinghouse have any interest in KWU?

Mr. PORTER. No, sir.

Senator SYMINGTON. What is the technology of the reactor to be built by KWU for sale to Brazil? Is it of a Westinghouse design and, if so, do you receive any royalties on it?

Mr. PORTER. We receive no royalties on it. It is not a Westinghouse design, but there was an earlier association between Westinghouse and Siemens which was the parent firm of KWU.

Senator SYMINGTON. But you do not get any royalties?

Mr. PORTER. No, sir.

Senator SYMINGTON. Then, in effect, they lifted the knowledge they got from you and used it in their deal with Brazil. Is that correct?

Mr. PORTER. I guess—

Senator SYMINGTON. Let us get the record straight.

Mr. PORTER. I think Mr. Bethel could answer that better than I can.

Senator SYMINGTON. I must say I do not like the idea of losing 20,000 jobs, or thereabouts, these days, because of any technicalities, when other people to whom we have been giving security, despite our heavy protests, pursue the same "deal." That is the thrust of what we are trying to get at.

Mr. BETHEL. I might amplify on the license arrangement between Westinghouse and Siemens to clear the picture up.

For several decades, almost from the inception of electrical engineering as a major factor in industrialized nations, there has been a license agreement between Westinghouse and Siemens, starting out, of course, with traditional heavy electrical apparatus. With the advent of commercial nuclear power that license arrangement was extended to cover commercial nuclear power applications.

However, with the formation of Kraftwerk Union, which resulted in taking some of the license arrangements out of Siemens' hands, Westinghouse reassessed its license position and decided that it would be in our best interest to terminate entirely the license arrangements, which we did under our termination rights in the agreements. Since the latter part of 1969, there has been no technological interchange and no payment of royalties to Westinghouse by either Siemens or KWU.

Senator SYMINGTON. Then you decided you would terminate any royalty arrangements?

Mr. BETHEL. Yes, sir.

Senator SYMINGTON. They sent you a letter of gratitude as a result of that?

Mr. BETHEL. The information which they had was of a vintage which now is quite old. The nuclear power technology has been evolving at quite a rate. I do not think what they got from us in the early days has anything like current applicability now.

Certainly in our case, it does not.

POSITION OF U.S. REPRESENTATIVE TO IAEA IN VIENNA

Senator SYMINGTON. Last month or earlier this month with Mr. Ashworth, the arms control expert on the Foreign Relations Committee, and Mr. Raymond of the Armed Services Committee, and General Knight of the Joint Atomic Energy Committee, we went to Vienna and talked at length with the International Atomic Energy Agency people.

Mr. PORTER, until recently you were Deputy U.S. Representative to the International Atomic Energy Agency yourself in Vienna. were you not?

Mr. PORTER. Yes, sir; I left in April, mid-April.

Senator SYMINGTON. You lived in Vienna?

Mr. PORTER. Yes, sir.

Senator SYMINGTON. How long were you in that position?

Mr. PORTER. About 4½ years, Senator.

Senator SYMINGTON. Since your departure from the U.S. mission to the IAEA, several months ago, the position has not been filled, which

I must add can only be explained to me on the basis of typical bureaucratic inaction.

Do you not think it is important that we should have somebody operating our position over there?

Mr. PORTER. Well, I would have to satisfy my ego by saying I think it is a very important position and I think it should be filled.

Senator SYMINGTON. Why is it not filled?

Mr. PORTER. I do not really know the answer to that, Senator. I would be inclined to suggest that the reason you gave is the most logical one.

LACK OF IAEA PARTICIPATION IN SUPPLIER NATIONS' CONFERENCE

Senator SYMINGTON. During this time the supplier nations' conference was held in London in June 1975. That was a secret meeting; was it not? I mean secret except for leaks that came out?

Mr. PORTER. The supplier meeting, yes sir, it certainly was.

I personally participated in about 2½ years of that kind of work, working with other supplier nations on policies relating to nuclear exports. After the Indian explosion, obviously, the problem became infinitely more urgent, and these meetings have been going on for some time.

Senator SYMINGTON. Was any representative of IAEA there?

Mr. PORTER. No sir, these were supplier nations who were trying to get together to work out a common policy relating to the exports of nuclear materials and equipment. Once they reached agreements on that policy, as was the case a year or so ago as the result of earlier meetings, they would then inform the IAEA what their policies were and ask IAEA to administer them. This is the way it normally works. There is obviously informal consultation, but the IAEA does not sit at the table with the supplier group countries.

Senator SYMINGTON. I have been around for some time and when the IAEA was formed the idea was that it was going to regulate international activities in the field, and yet you have a meeting in London on this issue with virtually all of the people involved and you are not even represented.

How do you explain that?

When I say you, I am not talking about your company. I am talking about the previous position you held with the IAEA when you were head of IAEA in Vienna?

Mr. PORTER. Of course I was really the resident head of the mission, the U.S. Mission in Vienna.

Senator SYMINGTON. Nobody from the IAEA was there?

Mr. PORTER. Nobody was invited to be there, no sir. I guess that the simple answer to the question would be that the IAEA is not a sovereign body; it serves its member states. A number of its member states were meeting to determine a common export policy which after agreement was reached; they would then ask IAEA to publicize and put into force.

IAEA'S LACK OF AUTHORITY

Senator SYMINGTON. As a member of the Joint Atomic Energy Commission this is one of the things I would like to see cleared up, because many people feel the IAEA sets down regulations that are observed by countries that are involved in what you might call the nuclear

effort. That is just a farce, because they have no authority. They monitor; they do not regulate anything. Here you have a country that only recently signed the Nonproliferation Treaty, and for the first time in the history of the world is selling a complete nuclear fuel cycle to a country that not only has not ratified, it has not even signed the treaty.

Nobel Prize winner Dr. Beatty sometime back described what would happen if there were an explosion with one of the major type nuclear weapons as against what happened at Hiroshima. I will ask unanimous consent to put his statement in the record at this point.

What we want to do is get the facts. It is unfair for the people of this country or any other country to feel IAEA is in some form a regulatory body. On this very rapid expansion of nuclear power, if you remember Dr. Oppenheimer once called it two scorpions in the bottle, well now you have six scorpions and three of the six have not ratified or even signed the Non-Proliferation Treaty. Very soon you are going to have a seventh, and no doubt fairly soon. But the Brazilian deal is specifically of interest to us because it sets Brazil up in the Western Hemisphere as a nuclear power; does it not?

Mr. PORTER. It sets Brazil up as a country with the potential by controlling its own nuclear fuel cycle.

Senator SYMINGTON. Its own destiny as to whether it wants to be a big power.

Mr. PORTER. The Germans, of course, have pleaded in a letter to the editor of the New York Times, I read the other day, that they have placed very careful safeguards as a condition to this sale, and while I am not defending the German position, I think what they have said should be stated.

On your remarks on IAEA, may I have a couple of minutes. My feeling on IAEA is this:

It, of course, is an imperfect instrument in an imperfect world. It cannot do more than member states wish it to do. It serves its member states. Our country nor no other country is yet prepared—I am being philosophical now—to place large measures of national sovereignty in an international organization or body.

Senator SYMINGTON. To whom does IAEA report?

Mr. PORTER. IAEA reports essentially to a board of governors of 34 member states which is the effective executive power of the agency in terms of setting policy. The United States is a permanent member of that Board and our influence as a leader in the peaceful atomic field has been, if not predominant, certainly significant.

If I can simply put it this way. IAEA, in terms of international nonproliferation measures, serves as a trigger mechanism which has been created by those, including the United States, who are concerned about nuclear proliferation. It can tell the world and should tell the world when the possibility of proliferation is something we should be worried about in a particular country. It can apply safeguards to detect and deter diversion of nuclear material, but it cannot, of course, tell the world what to do.

Senator SYMINGTON. You might say it is comparable in the nuclear field to the United Nations; is that not correct?

Mr. PORTER. Yes; but I would give it high marks. If I might be blunt, I think it has done a much more effective job.

Senator SYMINGTON. If I may be blunt, I was a delegate to the U.N. in 1968 and I was a delegate to the U.N. again in 1974, and I would give it lower marks.

Mr. PORTER. I think you and I are passing each other. We are agreeing. I am giving high marks to the IAEA.

Senator SYMINGTON. I do not blame you for defending the agency at which you worked in Vienna, but I must say that I was quite shocked to find out how little authority it had and how little attention was paid to it by those countries who, in effect, did what they wanted to do in the nuclear field. In my mind the most dangerous single condition the world faces today is the proliferation of nuclear weapons by other countries.

U.S. REPRESENTATIVES TO IAEA IN WASHINGTON AND VIENNA

Actually the U.S. representative of Ambassador rank does not even reside in Vienna; is that correct?

Mr. PORTER. No, sir; that is traditional.

The two jobs, my former job as resident representative and that now held by Ambassador Tape, who is resident in Washington, are, of course, authorized in the IAEA Participation Act which was passed by Congress. The idea was, I think, there should be somebody in Vienna who had more of a political background and somebody in Washington who knew the scientific community and who had personal stature in that community. So this is the way it has worked. Ambassador Tape and before him Ambassador T. Keith Glennan and before him Ambassador Henry de Wolfe Smythe have been the nonresident Ambassadors. All of them are illustrious names in the nuclear field.

Senator SYMINGTON. Your recommendation would be that the Ambassador would stay here rather than go to Vienna?

Mr. PORTER. I think he has got to be where the action is in terms of U.S. policymaking in Washington, and somebody else of high stature has to be where the action is in terms of the interplay of states in the political environment of Vienna and I do not think the same man can effectively do both jobs. Of course, the Ambassador is in Vienna several times a year for important meeting.

INCREASED EUROPEAN PURCHASES OF ENRICHED URANIUM FROM SOVIET UNION

Senator SYMINGTON. An article in the New York Times on July 6 entitled, "Europeans turning to Soviet Uranium" reports that the European economic community which traditionally has purchased enriched uranium almost exclusively from the United States is turning increasingly to the Soviet Union to fuel its nuclear powerplants, and I ask unanimous consent that that article be put in the record at this point.

[The information referred to follows:]

[From the New York Times, July 4, 1975]

EUROPEANS TURNING TO SOVIET URANIUM

(By William M. Drozdziak)

BRUSSELS—The European Economic Community, which traditionally has purchased enriched uranium almost exclusively from the United States, is turning increasingly to the Soviet Union to fuel its nuclear-power plants—at least through the 1970's, while Europe develops her own production capacity.

Not only has burgeoning world demand strained American production capacity to the limit, but also the Russians are selling the fuel at lower prices and with fewer transport problems.

The main reason for the escalating demand for nuclear power is the quadrupling in oil prices that has occurred since 1973. Nuclear power is the cheapest alternative to oil for production of electricity.

The Common Market countries, to cut their reliance on oil imports to 40 per cent from 65 per cent of annual energy needs over the next 10 years, plan to triple energy production from nuclear power plants by 1980, but their own nuclear fuel industries are not expected to reach maturity until the end of the decade. Therefore imports will be needed.

Should delays in the European fuel development occur, dependence on Russian nuclear fuel would be prolonged, and some question whether the Soviet Union would then try to exert political pressures through its dominant supply role.

Common Market energy officials, however, dismiss such a scenario. But one European diplomat mused: "Relying on the Arabs and Russians at the same time for our fuel supplies is not my idea of a secure energy posture."

Echoing the opinion of most observers, an E.E.C. energy official sees the purchase of Russian nuclear fuel as a simple business deal.

"We want to diversify our fuel sources, and the Russians provide one possibility. They, in turn, need to earn money to pay for Western machinery."

He added a caveat, though, reminiscent of the pre-detente era.

"We hope to avoid buying too much of their enriched uranium. After all, one must not tempt the devil."

The nine E.E.C. members still get most of their nuclear fuel from the United States, with less than 20 per cent coming from the Soviet Union, but the American share is expected to drop to 25 per cent in 10 years. In 1977, dependence on Russian enriched uranium will shoot up to more than 60 per cent, according to E.E.C. energy supply officials. They expect to import 3.2 million units of separative work from the Soviet Union that year and 1.7 million units from the United States, although the figures are subject to change.

The American fuel sells for \$42.10 per enriched unit and the price will rise to \$53.35 per unit after Aug. 20. The Russians use the American price as a reference and discount theirs by 3 to 5 per cent depending on the size of the order.

More important than price is the question of availability of the fuel. By Congressional act, the United States cannot pledge nuclear fuel deliveries above existing production levels.

In June 1974, the United States had to stop accepting new long term contracts to enrich uranium because the three enrichment plants run by the Energy Research and Development Administration were fully committed through the early 1980's.

As a result, European overtures to the Russians have been greeted with tacit approval by United States authorities.

This spring, Washington even granted permission to ship American uranium to the Soviet Union for processing into nuclear fuel destined for West German power plants. Using hydroelectric power from a giant dam near Lake Baikal, the Soviet enrichment plant is believed to produce annually as much nuclear fuel as each of the three American facilities.

Soviet output of enriched—that is, fissionable—uranium is estimated at 10 million units of separative work annually, about half the American production of 17 to 20 million units a year.

United States output, however, is expected to rise to 27 million units by 1980 and President Ford has said he will ask for legislation to authorize the production and sale of enriched uranium by private industry, thereby further expanding production capacity. At present there is a Government monopoly on such work. Europeans also expect to produce the fuel by that time, and they anticipate cutting Soviet imports to less than 2 million units by 1979.

The Russians started churning out enriched uranium for utilities abroad in 1971, when they signed a contract with the French to supply the Fessenheim power plant with a small amount of nuclear fuel.

Bigger enrichment deals followed with a growing list of nations, including West Germany, Britain, Belgium, Italy and Japan, and the Soviet Union seems eager to expand this trade.

Once supply contracts have been signed, the Europeans say they encounter no delivery problems with the Soviet fuel, in contrast to recurrent troubles over American shipments.

The latest dispute between the United States and the Common Market over nuclear-fuel deliveries occurred in April, when the United States Nuclear Regulatory Commission stopped issuing export licenses for all nuclear materials while it completed a full review of transport safeguards.

Common Market energy officials sent a vigorous protest to the State Department deploring the lack of consultation before the commission's move, which raised in their eyes, "serious concern over the security of [nuclear fuel] supplies from the United States."

American officials replied that public outcry over the discovery of a shipment of nuclear material through regular commercial channels in March provoked an urgent investigation before the Europeans could be informed.

The shipment in question—200 pounds of plutonium, a highly toxic, radioactive extract from spent uranium—was being flown from an Italian nuclear plant to the Westinghouse processing plant near Pittsburgh, through Kennedy Airport, where it was discovered.

In theory 200 pounds of plutonium would be sufficient to produce nine nuclear weapons with yields equal to that of the bomb dropped on Nagasaki during World War II, or a force of about 20,000 tons of T.N.T.

After the explanation, Common Market energy officials were more understanding of the toughened United States stance on nuclear controls.

"We obviously realize that you can't move this dangerous stuff around like sacks of potatoes," commented one official here later.

But like the Arab oil embargo in 1973, the recent controversy made it clear to many Europeans how vulnerable they are to the whims of outside fuel suppliers.

Consequently, the matter has evoked more strident European calls for expediting self-reliance in nuclear-fuel production—a goal that remains distant partly because of European differences over which of two processes to use.

Director of the Anglo-Dutch-West German nuclear consortium, Urenco, have called on the nine Common Market countries to increase financing to speed the development of European uranium enrichment plants. The consortium was formed in 1970 to develop jointly the centrifugal force method of enrichment.

Experts had been divided over the merits of that method of enrichment and the traditional gas diffusion process, used in Western technology since the Manhattan Project in 1945. Consequently a rival consortium, Eurodif, was formed by France, Italy, Spain and Belgium to build gas-diffusion enrichment plants.

In January, Iran lent Eurodif \$1-billion and announced that she would share in the costs of a new Eurodif plant being constructed at Tricastin in southern France.

Until the oil crisis struck, it appeared that the two consortia would be fighting each other to corner what was at that time, a relatively small market for nuclear fuel.

But now, booming world demand and the eroding American enriched-uranium monopoly have widened the future market and induced both groups to increase their original investment plans.

While Urencon could bring new capacity on stream in four years, the Eurodif system would take six to eight years. And a new gas diffusion factory costs at least \$2.5-billion, plus \$1-billion to finance the three thermal-power stations required for the plant's own energy needs.

Nor are costs and processing differences the only deterrents to expediting the move away from dependency on imports.

The wave of nuclear protests that swept the United States a few years ago as also reached Europe, and more people are becoming hostile to the spread of nuclear installations.

Last year, massive public opposition forced the French Government to abandon plans to build the Chinon nuclear-powered electricity station in the Loire valley and construction of the Wyl Nuclear Power Plant near Freiburg, West Germany, was halted by massive public opposition earlier this year.

Faced with such obstacles, the European nuclear-energy program will not achieve self-sufficiency for at least several more years community experts say. In the meantime the Soviet Union has found a lucrative source of hard currency.

Senator SYMINGTON. You would agree to those facts; would you not?

Mr. PORTER. Of course the Soviets are selling low-enriched uranium. The market is there, and they apparently have a tremendous capacity for enriching. It is one of the reasons I am concerned that the United States must move ahead to increase its enrichment capacity.

Senator SYMINGTON. Why has it not?

Mr. PORTER. Why has it?

Senator SYMINGTON. Why has it not moved ahead?

Mr. PORTER. That is a complicated question I really cannot answer, Senator. My personal view is that the decision should have been made 3 or 4 years ago to move ahead with additional U.S. enrichment capacity. Others have moved into the vacuum which was created by our failure to do so.

UNIQUENESS OF GERMAN-BRAZIL DEAL

Senator SYMINGTON. In summary, the German-Brazil deal is a unique deal in that they have also furnished a uranium enrichment plant; is that not correct?

Mr. PORTER. Not a plant, sir, they have sold or promised to sell a technology—the Becker jet nozzle process. Now it is not a technology that has yet been used to enrich uranium elsewhere. It is one that obviously can work. The question is whether it can be commercialized. I think that answers—

Senator SYMINGTON. Actually Dr. Agnew, who I found generally knows what he is talking about—he runs the Los Alamos Laboratory, was in Chicago where the first controlled reaction took place, and so forth—he points out if you go from 0.7 percent of uranium-235, the amount found in natural uranium, you only have to go to a relatively smaller enrichment capability for what you need to make electrical energy. Then you can utilize the plutonium produced. You do not have to go through to the 80-90 percent enriched uranium. Whether or not Brazil is given the technology or the plants is really secondary to the fact that West Germany has made a nuclear country in this hemisphere and Brazil has the uranium which we know they have. Is that correct?

Mr. PORTER. Sir, in indirect but perhaps also direct answer to your question, to me the worry is plutonium. The plutonium route today is the logical route for a country to follow if it is going to make a bomb. The worry in terms of nuclear proliferation is not enriched uranium, which must be highly enriched for weapons purposes. This is one reason why the light water reactor is the safest kind of reactor in terms of not creating proliferation problems. It uses low-enriched uranium, and does not produce a high-grade weapons type plutonium in the spent fuel.

Senator SYMINGTON. Let us summarize. Then I will yield to my colleague.

DECONTROL OF NUCLEAR PROLIFERATION SUGGESTED

In 1954, I can remember talking to Mr. Churchill about this and I talked about balance of terror. And perhaps Dr. Oppenheimer put even better when he talked about two scorpions in the bottle. Now we have six. Instead of trying to control that, it would seem everybody doing their best to decontrol it and to let everybody have as much of this material as they want.

Then you read that book by Dr. Taylor that pretty soon the small countries can get it, and then perhaps the people with intense feeling and not even countries, perhaps a minority or criminal elements can have it, instead of there being any limitation on it. And, to be frank until fairly recently I thought the IAEA was involved in preventing proliferation.

You say plutonium worries you the most and certainly should worry everybody.

I know that the French have completed a deal with a Middle East country where we figured out that country soon could make a minimum of 200 Hiroshima bombs a year. Dr. York testified that the Hiroshima bomb killed 100,000 people.

So as we see it, one of the primary purposes of these hearings is that this matter of controlling nuclear proliferation is rapidly getting out of hand.

ADDITIONAL INTERNATIONAL ARRANGEMENTS REQUIRED TO CONTROL NUCLEAR WEAPONS PROLIFERATION

In any case, in view of the limitations on the IAEA, and considering the rapid spread of nuclear weapon making capability around the world, what additional international arrangements do you believe are required to curb further nuclear weapons proliferation?

Mr. PORTER. Well, sir. I told you that I think the plutonium is the cause for major concern. Plutonium, of course, derives from the chemical reprocessing of spent fuel that has been burned up in reactors. In light water reactors the spent fuel that is burned becomes in a sense adulterated and it is more difficult to get weapons grade plutonium out of it. There are other types of reactors that are capable of making a purer grade of plutonium for weapons purposes. Among those is the Candu reactor. It is not designed for that purpose, of course, but it provides a possibility for achieving a better plutonium source.

With respect to your question on international arrangements, I believe that the world must urgently explore, and do its best to achieve regional reprocessing plants. Where you have plants scattered around the world which will reprocess spent fuel and derive plutonium in the process; these plants should have to be, I think, multinationally owned and perhaps operated. They have to have an international control and safeguarding mechanism built into them. Reprocessing is that point in the fuel cycle which concerns me most. The IAEA is working on such proposals now. It will need the help of all nuclear supplier states to achieve a solution. The problems in this project are formidable, the financial problems, siting problems, and problems of who manages the nuclear waste from the reprocessing plant. I am not minimizing any of these practical problems, but I do think the control

f the reprocessing part of the nuclear fuel cycle is perhaps the most important objective we should strive to achieve in an international approach to nonproliferation.

I also feel that ultimately a comparable regional and multinational approach should be made in the case of enrichment plants. If these plants were multinationally owned, and operated under rigid international controls, we could all breathe much easier with respect to how the product of the plant was being used or whether the product of the plant was being enriched to weapons grade level, which, as you know, has to be around 90 percent plus. This contrasts to a low enrichment level of say 4 percent for reactor fuel.

I do not wholly agree, as you know, with your views with respect to the value of IAEA. I think if the IAEA did not exist today you would have to create it. I think it is unique in the sense that it is the only international organization in the history of the world that I am aware of where nations have voluntarily given up a measure of sovereignty to allow international inspectors to operate on their territory. This is a vote of confidence, in most cases, for a world of order.

FIDDLING WHILE ROME BURNS SUGGESTED

Senator SYMINGTON. Some nations have and some nations have not, and I have the greatest respect for the work that you did over there when you ran our side of it: it looks to me that while the house is burning you are describing a new technology for putting out a future fire as a result of some new developments being put into some kind of fire extinguisher.

I noticed the other day that an authority in this field said if one of the larger bombs were dropped on the Capitol the scarred earth would be 36 miles in diameter. That means thousands of people would be killed in Baltimore. I am talking about fallout.

So you have this problem and for years nobody has been really looking at it. The Foreign Relations Committee tried to get information, sometimes successfully, sometimes unsuccessfully. The Armed Services Committee in the 23 years I have been on it has consistently displayed its disinterest in anything except what the Pentagon wanted in the way of weaponry. It has never looked into the problem in any depth and the person who I think has done the most to try to bring this matter to the public, and perhaps you will agree, is Senator Pastore, Chairman of the Joint Committee on Atomic Energy.

All we are trying to do is get information and I think we are fiddling while Rome burns as this proliferation problem expands. I think the best illustration of that is the loss by your company, the company you are presently with, of the contract with Brazil, because this Government would not agree to the stipulation of Brazil, while the German Government did agree to their terms and, therefore, they got the deal and we lost the 20,000 jobs, and so forth.

But I have expressed my position. I have asked you the questions that the staff and I drew up and I yield to my colleague Senator Biden.

Senator BIDEN. Thank you very much, Mr. Chairman. I apologize for being late. I was at a hearing of the Banking Committee.

I may be a bit redundant. If I am, please indicate so, and I will read the record so you will not have to repeat.

RATIONALE FOR U.S. NUCLEAR SALES

I would like to start at the back and work forward. In making an analogy to arms sales, every time I question someone in the Administration or any of my colleagues with regard to why we continue to supply arms for the world to remain at war, I am told if we do not the other side will. Also, we need jobs and at least this way when we supply the arms to the Middle East, for example, they have to come back to us for spare parts and we have some degree of control and that is how the scenario goes.

In that context I would like to ask you whether or not that same type of logic would apply with regard to the fear that the Chairman has and all of us have that proliferation of nuclear energy in a capacity to produce weapons, atomic and hydrogen bombs, characterizes our concern with regard to the recent arrangement between Germany and Brazil. If the United States had gone ahead with the deal, might the United States have had been in a better position to impose some restrictions and controls over the use of the technology and materials supplied?

If so, why would we have been able to?

Maybe you can elaborate on that a little.

Mr. PORTER. Senator, I can give a very simple answer to your question and the answer is yes, if the United States had sold to Brazil—

Senator SYMINGTON. A little bit louder.

Mr. PORTER. If the United States had sold to Brazil without question the controls that our Government would have required and the conditions of that sale would have produced a more effective safeguards regime because there would have been no chemical reprocessing plant in the package. What concerns me, carrying it one step further, is if when the United States finds it is out of the market, the international market, in nuclear sales, we also correspondingly lose our voice, our weight in the councils which concern themselves with establishment of effective safeguards around the world.

We carry weight in those councils now simply because we are the world's largest nuclear exporter, we, the United States Government. I am not speaking of Westinghouse. The possible loss of that ability to influence international non-proliferation policies, I think, is a serious and damaging prospect as the loss of the jobs.

Senator BIDEN. If that rationale is correct, then it would seem to me consistent with U.S. policy that it is sort of a foregone conclusion that many countries, Third World countries included, are going to be seeking a nuclear capacity. So what we should be doing now is actively pushing to become the supplier even to those countries who are slightly thinking about going nuclear. We should be in there to be sure we do not lose that footing. It is in our best interest to supply the whole world or the bulk of the world with this nuclear capacity, because otherwise they are going to get it somewhere else. So we had better go ahead and do it. Is that correct?

Mr. PORTER. Well, let me put it another way around.

The answer again is yes sir but do not forget that, and I am sure you are thinking of this, Senator—that the whole oil price and availability picture has changed the life of the developing world immeasurably. You now have the Fourth World. These are the fossil fuel

poorer countries of the world, the populous ones, every one of whom is turning in desperation to nuclear power as a way to survive in an energy sense. In providing them with nuclear powerplants, the United States adds not only measures of nonproliferation control and improves our own job situation, but at the same time we are responding to an essential need of the developing world in attaining its industrial development goals.

Senator BIDEN. I am not nearly as erudite or informed—I do not mean that sarcastically—as the Chairman of the Subcommittee. Most of this is brand new to me. I am going to ask you fundamental questions that will reveal my ignorance but enhance my background and knowledge in the area.

UNIQUE U.S. SAFEGUARDS PREVENTING BOMB PRODUCTION

What kind of safeguards exist when we make a sale which would prevent, to use the vernacular, them from using the waste product to produce a bomb?

What do we do differently than any other supplier of nuclear energy in order to prevent that end result? This is the fear that most of us commoners have. They are going to build a bomb and some idiot is going to decide he should be leader of the world and decide he is going to drop it somewhere, or set it off somewhere.

What safeguards do we have that are different than anyone else?

Mr. PORTER. Let me answer it briefly, Senator, and then if I find as I read the record that I have not done a good job may I elaborate on the record?

Senator BIDEN. Surely.

Mr. PORTER. The United States first enters into a bilateral agreement with the potential recipient country to which we are exporting. This is called a cooperation agreement. It is that. It is also a control agreement. It specifies the terms and conditions under which the export will occur, including the requirements for safeguards, requirements with respect to U.S. approval of reprocessing arrangements for spent fuel, and other measures—

Senator BIDEN. You say requirement for safeguards? What safeguards?

Mr. PORTER. Well, safeguards as required by the United States.

Senator BIDEN. Safeguards with regard to the—

Mr. PORTER. Inspection of the nuclear material for instance. Inspection of the material to assure that it is not diverted for any unauthorized purpose at any stage of the nuclear fuel cycle.

Once the exported nuclear material has been covered by the agreement, it continues to be covered under a U.S. agreement in perpetuity. It is followed and subject to inspection from that point on in time. Theoretically, one atom can be followed through the fuel cycle and be inspected and accounted for. Under our U.S. agreements the nuclear material and equipment which we sell abroad will be inspected forever, or until it is used up and is no longer of concern in a nuclear proliferation sense.

The United States Government delegates to the IAEA, in effect, its safeguarding rights which are established in the bilateral agreement, through a trilateral agreement between ourselves, the third country

and the IAEA. That trilateral agreement specifies the details of the safeguarding and assures that anything that the United States wishes IAEA to do with regard to safeguards and inspections is covered in the agreement; otherwise we would not sign it. The trilateral agreement is also approved by the IAEA Board of Governor.

Now, when we have an approved trilateral agreement, the United States then enters into a suspension protocol with respect to certain aspects of our bilateral agreement and we say to the country concerned, "So long as you abide by the IAEA agreement and we are satisfied, so be it, but we retain the right to reapply bilateral safeguards in a given situation whenever we are unhappy about developments or if the trilateral agreement is no longer in force.

Senator BIDEN. What form does that reapplication take?

Mr. PORTER. Well, it has never happened. It would simply be if we as a Government were not satisfied that all was well and, of course, I can no longer speak for the Government but I can speak for it as I knew it—if we as a Government were not satisfied with the safeguarding, if we had concerns, we would have the right to reimpose our own overlook on those nuclear activities in the importing country which contained our U.S. origin nuclear materials or equipment.

So we have that as a fallback position which we fortunately have not needed to use.

Senator BIDEN. I apologize for being so simplistic about it. But what form would that take?

For example, assume that we had made a deal with Brazil. Assume that Brazil had agreed to conditions upon which we make our sales. Then assume that 2 years, 5 years, or 10 years down the road, we became satisfied that Brazil was in fact diverting waste material to the production of atomic weapons. Would we then reinstitute the bilateral aspect of the agreement and IAEA would no longer be a factor? What form would that take? Would we land Marines? Would we say now you have broken the agreement, we are not going to send you any materials. Now you have three hydrogen bombs, we are not going to send you any more technology?

Mr. PORTER. I probably misled you. I was simply trying to describe the procedural steps which were available to us. It is very unlikely we would need to do that—to reimpose bilateral safeguards. If we felt that that country *x*, which had received U.S. nuclear imports was attempting to divert material to unauthorized uses, or if the IAEA, which in the first instance would discover this, felt similar concerns, the IAEA would immediately report the matter to the IAEA Board of Governors, which would take whatever steps it deemed necessary. The matter, if unresolved, would also then be reported to the Security Council, where again decisions on whatever sanctions would be applied by the international community would be taken. Individual countries could, of course, apply their own sanctions immediately in a variety of ways. The nature of their actions, concerted or individual, would depend on the situation and the depth of their concern—sending Marines or breaking diplomatic relations or cutting off aid are some of a wide range of options that could be considered.

WHY BRAZILIANS TURNED DOWN WESTINGHOUSE

Senator SYMINGTON. Mr. Ambassador, you and I have known each other for a long time and I am sympathetic with the fact you have recently been with IAEA and now you are with the generally considered No. 1 company in this field.

I would like to ask you this question. Perhaps you would rather have one of your colleagues answer it.

Why was it that the Brazilians turned down Westinghouse, who made an offer that was a very fine offer, from every angle, theirs and ours, and cost us a great many thousand jobs. Why was it that Brazil turned us down and took the German deal?

Mr. PORTER. Simply put, I think it was that the U.S. Government could not from its own production facilities satisfy the Brazilian need for enrichment services for fuel for its newly ordered reactors. The U.S. Government, of course, would also not commit itself, and could not commit itself in the near term at least, to agreeing that it would allow the export of the technology for an uranium enrichment plant in Brazil, a country which has not become a party to the Nuclear Non-Proliferation Treaty.

Westinghouse is not in the enrichment business, so the provision of enrichment know-how would have to come from another firm, in any case, or a government which possesses the know-how.

SOURCE OF GERMAN NUCLEAR TECHNOLOGY

Senator SYMINGTON. Who gave the nuclear technology to the Germans? Where do they get this technology? Do they get it from the United States?

Mr. PORTER. The Becker enrichment process principles, I think, have been in the public domain for a long time. It is an aerodynamic enrichment technology. It becomes an engineering problem. I think the U.S. Government may have tried the technique in the past and decided against it.

Senator SYMINGTON. Following Senator Biden's line of questioning, what you are really saying is that unless you have some strong form of control—the word *Marines* was used—when you furnish this information to these scores of countries that now have it in terms of reactors, what you are actually doing is also making it possible for them to make bombs because if the reactor is large enough, they can get the material to make the bombs through the creation of plutonium. Is that correct?

Mr. PORTER. Well, making a bomb is a different matter. We were talking about bomb materials.

Senator SYMINGTON. I thought you were worried about plutonium?

Mr. PORTER. The material itself is not easy material to handle, plutonium.

Senator SYMINGTON. I understand that. It seems to be a lot easier for some people to handle than to get the facts out this morning.

What I would like to ask, would there not be some question about the Germans going farther with the uranium enrichment technology

than our Government was willing to go in order to make this deal with Brazil?

Mr. PORTER. Certainly, sir. I am sorry, I thought I had covered that in my original statement. But indeed so.

Senator SYMINGTON. Thank you.

Senator BIDEN. I believe you have a comment, sir.

Mr. BETHEL. He reflected my comment in his response.

Senator BIDEN. Well, are there any specific ways which you believe, Mr. Porter, that the United States can require safeguards that would strengthen the ability to prevent a nation being supplied with this nuclear knowledge, from being able to turn it into nuclear weapons?

Mr. PORTER. Well, the problem, of course, is the material from which bombs are made. The safeguards system is designed to keep track of that material to assure that its diversion is detected. The system is not perfect. It's being improved. The improvement of inspection and control techniques is a technical matter, essentially, and I think it will be solved. So the issue really is not, in my mind, that a nation is going to make a national decision to break a safeguard agreement with IAEA and the United States, and attempt clandestinely to divert nuclear material from the peaceful nuclear fuel cycle. Such an attempt could, I believe, be detected. The problem is when a country makes a conscious and open decision to do this—I think this is the point that Senator Symington was making—what does the world do about it? That's the problem.

I don't think the world is going to be fooled. When diversion happens we will know it. The question is what is to be done about it.

A safeguard system can only push the button and give you the red light. Then the world's political structure has to decide how it's going to react, as do we as a nation.

DETERRENENTS AGAINST BRAZIL'S GOING NUCLEAR

Senator BIDEN. As a practical matter, there is little or no way to build in sanctions to the agreement. Let's face it. Sanctions are really the only incentive or disincentive for the production of nuclear weapons; aren't they? Why else would not these various countries, in this case Brazil, down the road become a nuclear power? Why would it not be in Brazil's best interest to in fact, if they have the capability and technology, now that they will have the material and technology supplied by West Germany to go nuclear? Why would it not be in their interest to do that other than the threat of imposition of sanctions if they attempt to do that?

Mr. PORTER. Now we are getting into motivations and I can't speak for the Brazilian Government.

Senator BIDEN. Is there anything in current world history that would indicate to you that it would not be in the interest of Brazil to do that? Can you cite me any example in the recent course of human events over the last 100 years where nations have not opted? I would be very interested to know. Maybe I'm just a young skeptic.

Mr. PORTER. I'm sorry I was going on to finish a point which was this. It's perhaps germane to your question. The Germans, of course, have asked for and received safeguards on this Brazilian deal. I don't know the details of the German-Brazilian contract. I assume that in

our subsequent hearings this will come out and the nature of that German agreement will be ascertained by the subcommittee.

The Germans, of course, have to ask for safeguards on all of this nuclear material and equipment exported to Brazil because the Germans have ratified the Nuclear Non-Proliferation Treaty and it's an obligation of all parties to that treaty that they cannot export nuclear material and equipment unless it's safeguarded.

So all I was trying to say is this: That material in Brazil will be safeguarded by the IAEA.

Now, if Brazil wishes to take the view of saying to hell with the world, and decides to take the safeguarded material and risk breaking other nuclear connections with Germany and other countries, perhaps with the rest of the world, in order to make a bomb, then the safeguarding system will tell us that that is going to happen. It is not designed to stop Brazil from making such a fateful decision; it can only deter.

Senator SYMINGTON. If the witness will yield. Do you think the United States has said to hell with the world, we have the most of the bombs? What difference does it make if the largest country in South America goes nuclear?

In that connection I would like to offer an article from the Die Welt of June 27, reprinted in the German Tribune of July 10, that says:

This country stood accused of helping Brazil to manufacture its own nuclear warheads, of encouraging—in a fit of madness—the nuclear arms race in Latin America and other continents and jeopardizing the security of the world in general and the United States in particular.

The nonsensical nature of such arguments is demonstrated by the attitude of the U.S. government. As long ago as 19 February, six days after the treaty draft was completed, Martin Hillenbrand, U.S. Ambassador in Bonn, was notified of the full text by this country's chief negotiator, Dr. Peter Hermes of the Foreign Office.

Bernd von Staden, Bonn's Ambassador to Washington, similarly informed Fred C. Ikle, head of the U.S. disarmament and arms control agency.

The U.S. government asked questions and received answers but on no occasion has felt it necessary to make formal inquiries or lodged formal protests in Bonn.

Dr. Kissinger has seen no need to make official representations and President Ford did not discuss the subject during President Scheel's state visit.

Just going over for a little more.

Were Brazil ever to envisage developing nuclear weapons to counter similar ambitions on the part of, say, Argentina, which is currently negotiating with Canada for heavy-water reactors of its own, it could do so without having recourse to the agreement with this country.

If Brazil is determined to become a nuclear power there is nothing this country can do to stop it.

[The information referred to follows:]

[From the German Tribune, July 10, 1975]

FOREIGN AFFAIRS—ARE U.S. MISGIVINGS JUST SOUR GRAPES?

Brazilian Foreign Minister Antonio da Silveira and this country's Hans-Dietrich Genscher have signed in Bonn an agreement on nuclear cooperation between their respective governments.

Short-lived and unwarranted controversy raged both in Congress and in a number of US newspapers in view of the deal's scope and extent, but there has been no formal protest by the US government.

The agreement came into force the moment the two Ministers put pen to paper. It has been published in full and includes no confidential provisions whatever.

By the terms of this agreement Bonn has more than complied with its obliga-

tions as a party to the nuclear non-proliferation treaty and a member of the International Atomic Energy Agency in Vienna.

Brazil too has consented to inspection arrangements and given binding undertakings that the plant and equipment to be delivered will be used solely for industrial as opposed to military purposes.

As a non-signatory of the non-proliferation treaty Brazil was under no obligation to do so.

Accusations levelled by newspapers such as the *New York Times* and by Senator Pastore, chairman of the Congressional atomic energy committee, are entirely unfounded and in part based on absurd arguments.

This country stood accused of helping Brazil to manufacture its own nuclear warheads, of encouraging—in a fit of madness—the nuclear arms race in Latin America and other continents and jeopardising the security of the world in general and the United States in particular.

The nonsensical nature of such arguments is demonstrated by the attitude of the U.S. government. As long ago as 19 February, six days after the treaty draft was completed, Martin Hillenbrand, U.S. ambassador in Bonn, was notified of the facts by this country's chief negotiator, Dr. Peter Hermes of the Foreign Office.

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Dr. Kissinger has seen no need to make official representations and President Ford did not discuss the subject during President Scheel's State visit.

Had the U.S. government viewed the deal between Bonn and Brazil with the merest suspicion of the alarm raised by Senator Pastore and a number of American newspapers it would unquestionably have made such representations to Bonn without further ado.

What is more, no objections have been raised by any signatory to the non-proliferation treaty—not even the Soviet Union, which cannot be said to view nuclear developments in this country with anything but baleful mistrust.

The Brazilian package opens up for this country's underemployed reactor industry an only partially developed market that is as yet largely dominated by the Americans but in which Britain, Canada and France have also gained a foothold.

Technologically advanced countries such as Japan, Sweden, Israel or Italy will doubtless soon also set their caps at this promising market.

Firms from this country are to build an initial two 1,250-megawatt nuclear power stations, with an option for a further half dozen, and also to supply Brazil with uranium processing and enrichment know-how.

The entire deal may be worth 10,000 million Deutschmarks or more. Since this country must export or die and can only remain competitive in the nuclear sector by exporting plant and equipment there is every economic justification for the agreement.

It just will not do for industrial giants such as the United States to corner not only aircraft development and the computer business but also the reactor market.

This runs counter to the principles of the free market economy, which Washington has already undermined by offering attractive Import-Export Bank credit terms and thereby piping this country at the post in respect of nuclear deal with Yugoslavia and Spain.

Closer examination of the text of the agreement with Brazil shows how unjustified claims are that Bonn is undermining the non-proliferation treaty by supplying Brazil with uranium processing and enrichment know-how, which would enable the Brazilians to manufacture enriched uranium and plutonium for use in nuclear warheads.

The Brazilian government has expressly agreed to inspection of plant and equipment supplied by this country in accordance with the provisions of the International Atomic Energy Agency.

Brazil has further undertaken not to sell equipment to third parties without this country's consent and to comply with the regulations concerning works protection. So military exploitation of know-how from this country is out of the question.

What is more, the Brazilian government has expressly embraced the fundamental concepts of the non-proliferation treaty. For the foreseeable future Brazil has not the slightest intention of joining the nuclear club.

There is no reason why Brazil should have any such intention, there being no power in Latin America that constitutes a threat to what is, after all, the continent's largest country and fastest-growing economy.

Were Brazil ever to envisage developing nuclear weapons to counter similar ambitions on the part of, say, Argentina, which is currently negotiating with Canada for heavy-water reactors of its own, it could do so without having recourse to the agreement with this country.

If Brazil is determined to become a nuclear power there is nothing this country can do to stop it.

The real problem is another. The energy crisis has accelerated the development of atomic energy. By the mid-eighties there will be so many nuclear power stations in operation that tens of thousands of nuclear devices could at a pinch, be manufactured.

By then processing and enrichment techniques, such as isotope separation, will have made further progress and virtually become common knowledge. This, then, is the real danger, and the blame can hardly be laid at Bonn's door.

Countries that have wanted to prevent nuclear proliferation have themselves behaved entirely in keeping with their fine words. International agreements such as the non-proliferation treaty have long been overtaken by scientific and technological development.

Since the 1963 test-ban treaty America and Russia have conducted more nuclear tests underground than they did atmospheric tests in the eighteen years beforehand.

Since the 1968 non-proliferation treaty the two superpowers have stockpiled more nuclear devices than ever before and since the 1972 Salt agreement nuclear weapons systems have grown increasingly sophisticated.

Non-proliferation makes a deceptive distinction between peaceful and military uses of atomic energy. In reality this distinction is virtually irrelevant.

Countries that reach a high level of non-military nuclear development automatically assume the status of threshold powers because there automatically comes a time when they are in a position to cross the threshold if they so wish.

If the threat nuclear power unquestionably represents is to be reduced to manageable dimensions after all industrialised countries everywhere will have to agree to equal terms in the exploitation of atomic energy in both sectors, submitting voluntarily to appropriate restrictions and controls.

What are the prospects? The recent Geneva conference to review the non-proliferation treaty proved totally unsatisfactory because of the attitude adopted by the major nuclear powers.

President Johnson once undertook to allow IAEA inspection of US peaceful nuclear facilities. So far this has not happened.

Since last autumn a prospect of effective international ties has emerged with the establishment of an informal club of nuclear technology exporters consisting of America, Canada, Britain, France, Russia and this country.

The group has so far met twice only, the last occasion being in mid-June, but it could be established more formally as say, Nutex, an association of nuclear technology exporters, and set its cap at fresh targets in the fight to forestall nuclear madness.

Yet the formation of such a body of this kind would only prove possible on condition that a number of countries, particularly the United States, climbed down from their high horse of nuclear monopoly claims.

POSSIBILITY OF DIVERTING MATERIAL TO NUCLEAR WEAPONS

Senator SYMINGTON. "This country," of course, means Germany. So what we are really talking about, according to that article, and what we have discussed this morning, is that any country which learns how to make electric energy in any quantity through nuclear power, if it wants to, can become a country with nuclear weapons; isn't that correct?

Mr. PORTER. Well, I would say not in several ways. Obviously if the nuclear fuel is reprocessed in that country, and the reprocessing is under the exclusive control of the country, the answer is "yes." If the fuel is reprocessed elsewhere, and plutonium is removed from the coun-

try or remains under multinational or international controls, the answer is "No."

Senator SYMINGTON. You are talking about theory. You are not talking about actuality.

Mr. PORTER. I'm simply trying to define ways and means of attempting to control the situation.

Senator SYMINGTON. I understand that. But based in the way things are going now, I think Senator Biden mentioned Indian and the surprise of the Canadians that India did what it did, and I'm not saying that we can't work out a process for controlling the plutonium incident to reprocessing, but the fact is that there really is no control today. Is that correct?

Mr. PORTER. The control, of course, of the material is there now where IAEA safeguards are in effect. But there is no international army that will stop a country from saying we are going to seize the material and divert it except the army of world opinion.

Does that answer your question?

Senator BIDEN. There is control, it seems to me, only in the sense that a sprinkler system or alarm system in a building controls the fire. If there is a major fire in this building, there are sprinkler systems or alarm systems which will be set off. They react to the heat and set off an alarm. However, if the Washington Fire Department does not come, the whole building is going to burn down because there is no self-starting mechanism that is going to put out the fire in this building. Therefore, there isn't any control; all there is is a warning. It disturbs me that we keep talking about control when in fact we are actually talking about the warning mechanism.

I'm not saying that this isn't needed, valuable, a great contribution, a step forward, and all the rest. But it really is misleading, seems to me when we talk about control.

For example, the President of Brazil and his Senate created a company linked, but independently administered, company called IMBEL a few weeks ago, to manufacture military equipment. I guess it's a safe assumption to imagine they will eventually reap benefits of the supply technology equipment and waste materials. It seems to be a foregone conclusion on most people's part that eventually they are going to be building a bomb. I don't think it's coincidental in light of the stated interest of Argentina and the relationship of Argentina and Brazil and the newly created company.

I think we have to be naive to think that in fact there is no connection there. There is no guarantee that Brazil has no intention whatsoever of moving into the capability of being able to produce and in fact, producing nuclear weapons. What in the heck are we going to do about it?

ARGUMENT WE SHOULD BE PROLIFERATOR TO CONTROL PROLIFERATION

The only reason I raise it now is your logical response to my question, which was that the best way for us to get the best available handle on the question of proliferation is for us to be the proliferator. That argument always disturbs me; yet I have no counter to that argument. I get so damn frustrated I don't know what to say, except your response makes sense on its face, but it's the same kind of catch-

22 position we find ourselves in with regard to the supply of weapons, and I don't know what to do about it.

I'm not suggesting that you have a responsibility to know what to do about it. I guess I'm just expressing my frustration, and maybe to the wrong parties.

I don't mean this in a personal sense, but the argument that we should be the proliferator to make sure that proliferation is controlled bothers me. That's like saying if you don't do it to her someone else will, so you might as well.

Mr. PORTER. I have to define my terms on this one. I think there is a heck of a lot of difference in selling energy to a country that can't get it any other way and selling tanks to that same country.

Senator BIDEN. I feel more comfortable with the tanks. At least the tanks can't shoot across the Atlantic yet.

Mr. PORTER. I guess I have been more exposed recently to the problems of the energy-deficient developing world. I think when you consider a country like Pakistan, with 70 million people, and no appreciable amounts of oil and coal, what are you going to do if you are prime minister of Pakistan? Are you going to say, I will deny my people the right to have nuclear power?

Senator BIDEN. No, no, I'm going to want it, and maybe I'm going to want to make a bomb, too. But I don't give a damn about Pakistan in this sense. I don't give a damn what their self-interest is; I'm concerned about the self-interest of the United States as reflected by our action with regard to Pakistan.

Mr. PORTER. The point I was trying to make is I think I can make in my own mind a major moral distinction between selling energy systems to a country that needs energy and selling that same country certain other things. I can't make the same ethical comparison that you are making.

Now if we are talking about the fact that country "X" intends to make a weapon, I think obviously you won't sell if you know that or if you have that clear assumption. If you know, on the other hand, that country "X" will accept all the international control mechanisms and safeguards that the world has produced, then some supplier country is going to make the sale to country "X." The supplier country will feel it is a reliable supplier because it is assuring as a condition of sale the application of all the safeguards which the world is demanding these days. This is what happened in Brazil.

So, it's going to end up that country "X," "Y," or "Z" will have nuclear power reactors, under safeguards, from some nuclear supplier nation.

I don't like to make the analysis go any further on selling arms versus nuclear power, but there is a lot of technical difference. There are ways in which the use of nuclear materials can be controlled so long as the selling country insists on such controls.

WHAT WAS OFFERED BRAZIL AND COULDN'T BE PROVIDED

Senator, I should answer one more question for you. I think I misled you at one point very early on. This was with reference to the Brazil sale.

Did I understand you to think that the United States was going to sell or offered to sell an enrichment plant to Brazil?

Senator BIDEN. No.

Mr. PORTER. That isn't the case.

Senator BIDEN. As I understand it, that's why you didn't get the deal?

Mr. PORTER. Yes.

Senator BIDEN. And am I mistaken on that?

Mr. PORTER. The only other thing, the concern which we mentioned before you came in, was that the United States was unable to provide enriched uranium—not the plant, but simply an assured supply to enriched uranium for fuel for the Brazilian reactors.

BRAZIL'S SEEKING OF ARMS SELF-SUFFICIENCY

Senator BIDEN. I would like to submit for the record, although I admit it does not in fact directly relate to nuclear weapons, because it's in the context of the question that I asked, an article which appeared on July 9 in the Washington Post entitled "With Army-Linked Firm; Brazil Seeks Arms Self-Sufficiency." It seems to me that a country that in fact is likely from their own self-interest to seek arms self-sufficiency would seek arms of self-sufficiency from the equivalent of the M-1 rifle to a bomb. I don't see where the modus operandi of the controlling facts of that government would in fact get to a point where they would stop and make a distinction. They could say, "If we violate a nonenforceable agreement we may be in the position to produce the ultimate weapon. But we shouldn't do that because we don't want to violate an agreement, although we seek arms self-sufficiency." That's the context in which I raise the question. This is not meant to be a reflection on Westinghouse or you, Mr. Ambassador; it's more an expression of my lack of knowledge and frustration in the area.

So I would like to ask that be put in the record. I have no other questions and I will yield to my more knowledgeable colleague.

[The information referred to follows:]

[From the Washington Post, July 9, 1975]

BRAZIL SEEKS ARMS SELF-SUFFICIENCY WITH ARMY-LINKED FIRM

(By Bruce Handler)

RIO DE JANEIRO, July 8—Brazil, which has caused concern in the United States because of its drive to become an independent producer of nuclear energy, also is seeking self-sufficiency in military weapons.

President Ernesto Geisel has proposed creation of an army-linked but independently administered company to manufacture military equipment. The Senate last week went through the formality of approving the proposal of the military-controlled government, and the company—to be called Imbel—is to be set up within a few months.

Imbel will be an opened operation. Private weapons manufacturers, perhaps including foreign companies, may later be taken in as minority partners if the army thinks this will aid Brazil in developing its own arms-making knowhow.

For the immediate future, Brazil still will be dependent on the United States and Europe for such military equipment as jet fighters, submarines, self-correcting missiles and computer-run weapons-guidance systems.

But this country will rapidly increase local production of artillery pieces, tanks, armored reconnaissance vehicles, rocket launchers and machine guns, as well as

illets, armor plating, field bridges, bullet-proof vests, uniforms, tenting and jungle-survival rations.

It also is possible that after Imbel gets going, Brazil will export military gear to other Third World countries, but this is not on Geisel's list of priorities. Brazilian companies currently sell nonmilitary pistols, rifles and shotguns to Europe, the United States and the rest of Latin America.

Officers with the U.S. military mission to Brazil do not see Imbel as necessarily a bad thing, although they are aware of the negative reaction that erupted in the U.S. Congress recently when Brazil announced a multibillion-dollar deal with West Germany to acquire the technology to build its own nuclear reactors. Concerns were expressed that Brazil would build an atom bomb, although the Brazilians insisted the nuclear knowhow will be applied exclusively to the generating of electricity.

U.S. military people seem to feel that Brazil is a proven ally—it sent 25,000 men to fight on the American side in Europe in World War II and its supply of troops to the Organization of American States for Dominican Republic service helped to frustrate the United States from its 1965 invasion there. A strong, independent Brazil is believed ultimately to be good for America is the feeling.

Brazil's capacity to produce weapons probably is of greatest concern to the Spanish-speaking republics of Latin America, which traditionally have been wary of "mini-imperialist" ambitions on the part of the continent's lone Portuguese-speaking country.

President Geisel has said many times that Brazil wants to live in "fraternal coexistence" and "does not nurture ambitions of hegemony." But he also says that Brazil is "conscious of its place in history" and must act with "agility" to protect itself from the dangers of the changing world economic and political situation.

During the controversy over the German nuclear pact, Brazilian officials tried to explain that Brazil, which imports three-fourths of the crude oil it uses annually, cannot remain dependent on outside energy sources.

Imbel will have a special federal credit of \$3 million to start, but its actual initial working capital is secret. Last year the army spent \$64 million on locally made weapons and equipment to replace those that formerly had been imported. Other branches of the armed forces also are embarked on programs to cut down weapons imports.

The navy builds its own frigates and patrol boats and is switching to Brazilian-made ammunition and communications gear.

The air force makes its own electronic ground equipment, airborne radios and weather radar. It is turning to local private industry for small aircraft engines, rocket fuel and, eventually, research and combat rockets.

A little-publicized clause of the Brazilian contract with Northrop Corp. for 36 F-5E jet fighters and six F-5B trainers calls for a mixed government—private Brazilian aircraft company known as Embraer to manufacture and export F-5 components to the United States over the next 10 years.

That contract has been in the news otherwise because of a questionable relationship between Northrop and a consulting outfit run by retired Brazilian air force generals.

Embraer is also assembling jet trainers under license from a private Italian company, with each succeeding plane having a greater percentage of Brazilian parts.

For many years, the Brazilian air force has been acquiring rocketry experience and technology from the United States, West Germany and Canada at its Araraquã do Inferno (Hell's Gate) base, just a few miles south of the equator. Foreign technicians say the Brazilian base is excellent for testing rockets because the earth's gravitational pull is less there than in Western Europe, Florida or California.

WHETHER IAEA HAS ANY TEETH

Senator SYMINGTON. One other point before I yield to Senator Case. What we are discussing really is whether the IAEA has any teeth. Where you and I differ, I say this with great respect, is that up to now, in my view, there has been no meaningful control through the IAEA from the standpoint of being able to control the inevitable production of plutonium incident to the production of electric power.

ADMINISTRATION POSITION ON BRAZIL DEAL

Senator BIDEN. In that same regard I guess really what I was discussing was something even beyond that, and that is what the devil : American foreign policy? What is the administration policy with regard to this kind of activity in the Western Hemisphere? That is really what is at issue as far as I'm concerned. We lack knowledge in the subcommittee, at least I do in this subcommittee, and I suspect everyone else, with regard to what the administration position was on this deal. What in fact is our stated foreign policy with regard to something that could potentially impact so drastically upon international affairs in the Western Hemisphere. That's really it. It seems to me the bottom line we ultimately get to even beyond the question whether or not IAEA or any other international agency has any teeth in it is what is our policy. It's far beyond the realm of responsibility of the Westinghouse Corp. unless the president of Westinghouse is considering running for President. I don't know that.

Senator CASE, Mr. Chairman, I understand exactly the concern our colleague from Delaware has expressed and that is one reason I was happy to be able to get to part of these hearings. Trying to be in two places at once is a common experience we all have and I had it this morning. But I have been fortunate enough to have met Mr. Porter before. I'm very glad to have his statement on the record. I'm sure he said in this public hearing what he has told us before, in substance.

In relation to the specific point that Senator Biden just made, that he would like to know what our policy is, I think it's very useful that we are going to have administration witnesses up next week. I think that is the place to put that question very strongly to them. I can't imagine that this is going to have any partisan connotations because this is a problem we all face as Americans, as people living on this planet, in a world which is far from perfect. Any handle we can get on it I think we all want to join in getting, including, I'm sure, this administration. The initiative the administration took by the conference in London is an example of that. But I'm not here to present their view at this moment.

I thank the Chairman for his initiative in bringing this thing up and I look forward to further testimony to be discussed at next week's and subsequent hearings.

Thank you.

Senator SYMINGTON. Thank you, Senator Case.

I think we are going to have witnesses up on Tuesday to develop further some of the points that have been brought up this morning.

Senator JAVITS.

EXTENT CORPORATION SHOULD BE RESPONSIVE TO U.S. FOREIGN POLICY

Senator JAVITS, Mr. Chairman, I, too, like Senator Case, have had to be in two places at once and I have not had the opportunity to hear Mr. Porter, but I did wish to ask, and came especially for that purpose, this question.

To what extent should a great corporation like Westinghouse be responsive to the foreign policy of the United States, which is not necessarily incorporated in mandated law?

Mr. PORTER. Senator, I can speak with respect to the company's position on the issue of nuclear nonproliferation which is, of course, what you are talking about today.

The company has expressed publicly its strong view on this subject in a recent letter to the editor of the New York Times which stated our concerns and three main points with respect to our recommendations of what might be done. These were, in effect, policy judgments and recommendations on the part of the company with respect to further action of the U.S. Government in the international community.

With respect, of course, to Westinghouse's export sales, the question was covered earlier in the testimony. We do not, of course, engage in any sales of nuclear materials or equipment abroad without thorough discussions with our Government on the political and related aspects of those sales. Those dialogs can stretch into rather long periods of time.

I think Westinghouse feels a logical sense of concern over the problem of nuclear proliferation. We feel that nuclear energy really is an absolutely essential contribution to the future sources of energy in the world, not just in our own country but in many others, and it is the corporation's most highly rated objective in terms of its nuclear export sales to assure that a nonproliferation regime exists in the world which will enable those sales to be carried out within a safeguard framework which will make the world feel safer.

I think that sums it very, very briefly.

Senator JAVITS. Even if it represents actions against its self-interest in terms of profits, will the company decide, based upon the views of our Government, not to make sales? Is that company policy?

Mr. PORTER. Indeed.

Senator JAVITS. And in that regard would it be guided by the State Department even in terms of stretching the point? In other words, if it didn't fully agree, but the State Department felt it shouldn't go that way, it wouldn't, whatever the law might say?

Mr. PORTER. That certainly is the case and, of course, ultimately the whole thing becomes a licensing matter as well. It would be common-sense, I think, to avoid having a showdown at that late stage of the game.

Senator JAVITS. Sometimes the showdown is so difficult for the Government that the Government would have to grant the license if you, notwithstanding its advice to the carrier, pushed it. That happened before. So it is very important that company policy should be not to push it at all if the State Department frowns upon it. And that's what the company policy is?

Mr. PORTER. I have only been with the company recently. Maybe Mr. Bethel can respond to that.

Mr. BETHEL. I would like to amplify a little bit. It's our policy and our practice to keep the appropriate agencies of the Government informed as we proceed in all of these international negotiations and keep them informed both on a formal and on an informal basis both here in Washington and at the embassy in the countries overseas, because we see the need to have the same or to build the same tight cooperation between industry and the U.S. Government that we see happening, for example, in the German situation where the chief negotiator was

in fact a German official. So we do work closely with all elements of government.

Senator JAVITS. Thank you.

Thank you, Mr. Chairman.

Senator SYMINGTON. Ambassador Porter, we are very grateful to you.

Mr. Bethel, do you have anything further you would like to say

PROLIFERATION CONTROL BY MEANS OF FUEL RODS

MR. BETHEL. I would like to make one comment which I think possibly can be helpful as you go and think about controls, and it's simply a technical one, if you will, but I want to describe the interface between a pressurized water reactor, or a boiling water reactor, both of which operate for the production of electrical power, and the question which you are addressing, which is safeguards against proliferation.

That interface is the fuel rod which comes out of the reactor during the time the reactor is off line and not generating power. The fuel rod is about as big around as this pencil. It's about 10 feet long. There are a few thousand of them in the reactor.

The fuel rod is made of a welded metallic cladding called zircalloy. Inside it are several things. One is the uranium which was not consumed. Second is the waste fission products which were generated by the fissioning in the reactor. A third is the plutonium which was created.

So as long as they remain in the fuel rod, that plutonium cannot be made the base material for a bomb. What has to happen is that the rod must be chopped up, chemically treated, the plutonium extracted, then transformed to the size and shape of the bomb. The control must start with a physical control of these fuel rods.

Senator SYMINGTON. What you are talking about then, and I don't mean to interpret it along my own thinking, is some formal teeth in the control of plutonium?

MR. BETHEL. Let me suggest the proposition is on the table to have regional reprocessing centers which must be under the physical control of a nonnational entity, and that all of these fuel rods from all of the reactors in that region should go to that regional reprocessing center where the material can be in the physical custody of nonnational interests.

Senator CASE. Also have all powerplants in the same central place so they can be under the physical roof of the agency?

MR. BETHEL. If you recall the interface as I described, as long as you have a means of assuring physical custody of the fuel rods when they come out of the powerplant, what happens in the powerplants need not be at stake.

Senator CASE. How can you have control over them when they come out if you're not right there?

MR. BETHEL. You must be there.

Senator CASE. So you want to be in the powerplant itself.

MR. BETHEL. Absolutely.

Senator SYMINGTON. Or you must have an agreement whereby they are shipped back to you?

MR. BETHEL. Yes, sir.

Senator CASE. How do you monitor such a thing and how do you carry it out even though you monitor and find out something has gone wrong. How do you stop it?

Mr. BETHEL. That's the point Ambassador Porter commented on earlier. We will know when it has happened.

ATTITUDE OF OTHER SUPERPOWER

Senator SYMINGTON. Certainly I asked this question. There is another superpower. For that country I have great respect. They would be, I would think, about as anxious as ourselves to see that this matter is brought under some form of world control. Wouldn't you agree?

Mr. BETHEL. I would think so.

Mr. PORTER. A quick comment on that. From my past experience certainly working with them on the question of safeguarding nuclear materials and the establishment of an effective nonproliferation regime, there is simply total agreement on objectives.

Senator CASE. That isn't going to agree with Russia as much as it is with some other countries.

Senator SYMINGTON. Mr. Enright.

Mr. ENRIGHT. No thank you, Senator.

Senator SYMINGTON. Anybody else, gentlemen?

Thank you very much. We appreciate your courtesy, knowledge, and your help.

[Whereupon, at 11:40 a.m. the subcommittee adjourned subject to the call of the Chair.]



NON-PROLIFERATION ISSUES

TUESDAY, JULY 22, 1975

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 2:30 p.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, Humphrey, Clark, Biden, and Javits.

Senator SYMINGTON. The hearing will come to order.

OPENING STATEMENT

This afternoon the Subcommittee on Arms Control, International Organizations and Security Agreements of the Foreign Relations Committee continues its inquiry into certain background aspects of the recent German-Brazilian agreement, by which West Germany will transfer to Brazil a complete nuclear fuel cycle, in other words, a capacity to make nuclear weapons.

In testimony before this subcommittee last Friday representatives of the Westinghouse Electric Corp. disclosed that Westinghouse had entered into negotiations with Brazil on a similar nuclear arrangement long before German companies clinched the deal. But Westinghouse apparently could not meet Brazil's demand for a complete fuel cycle because the policy of the U.S. Government prevented such a sale. Westinghouse testified that as a result not only did they lose between \$4 and \$8 billion in business—which could have greatly helped our balance of payments—but also some 20,000 jobs.

Yet, even though the United States denied itself these large economic benefits owing to our concern over the nuclear proliferation aspect of the proposed sale, we nevertheless allowed West Germany to go ahead with it, a country for whose defense we have spent several hundred billion dollars.

Last month the Department of State testified that the U.S. Government had protested and even tried to stop the German-Brazilian deal. But the West German Government flatly denied that and continues to deny that any protests of any kind were made by the United States.

This discrepancy has yet to be cleared up.

The subcommittee also notes that the Common Market is reportedly turning to the Soviet Union for enriched uranium, which it has in the

past purchased almost exclusively from the United States. Over the next few years it is reported that Common Market dependence on Russian enriched uranium will go up approximately 20 to 60 percent.

This afternoon's testimony is designed to clear up some of these matters as well as some other recent developments in the nuclear field.

We have with us Mr. Myron Kratzer. Would you identify yourself?

Mr. KRATZER. Yes, sir.

Senator SYMINGTON. And Mr. George Vest and Mr. Abraham Friedman.

If you will come up and sit at the table, please.

Mr. Kratzer is Acting Assistant Secretary of the Bureau of Ocean and International Environment and Scientific Affairs of the Department of State.

You took Dr. Ray's place?

Mr. KRATZER. On an acting basis; yes, sir.

Senator SYMINGTON. Mr. Vest is Director of the Bureau of Political and Military Affairs of the Department of State. And Dr. Friedman is Director of the Division of International Programs, Energy Research and Development Administration, commonly termed ERDA.

Is that correct?

Mr. FRIEDMAN. Yes, sir.

Senator SYMINGTON. Mr. Kratzer and Mr. Friedman, you have prepared statements. We have seen them and read them.

We suggest in order to get along with the questioning you file them for the record and answer our questions, if that meets with your approval.

[Mr. Kratzer's and Mr. Friedman's prepared statements follow:]

PREPARED STATEMENT OF MYRON B. KRATZER, ACTING ASSISTANT SECRETARY,
BUREAU OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC
AFFAIRS, DEPARTMENT OF STATE

Mr. Chairman and members of the committee, it is a privilege to appear before your Committee today, on behalf of the Department of State, to offer testimony on the important issue of proliferation of nuclear weapons. Today, more than 30 years after the commencement of large-scale productions of fissionable materials by the United States, five additional countries—the Soviet Union, Great Britain, France, the Peoples Republic of China, and India—have developed and tested nuclear explosives. In your statement of July 15, you described this situation as six scorpions in a bottle.

I believe it is a fact of considerable importance to our understanding of how proliferation has come about so far, and what might be done to avoid it in the future, to note that of these six countries, only one—India—has made use of plutonium produced in facilities which were substantially assisted by outside sources under arrangements for cooperation in the peaceful uses of nuclear energy. Of the remaining five, four made use of plutonium which was produced not in nuclear power reactors, but in much simpler facilities, specifically designed for plutonium production. In the case of India, the plutonium was derived from a research reactor which resembles one type of plutonium production reactor and which is also much simpler than a nuclear power reactor.

These facts illustrate that, while the diversion of materials produced in the nuclear power fuel cycle is one route to proliferation, the route traditionally used to acquire material for nuclear explosives is the construction of much simpler facilities, specifically suited for production of fissionable material. The U.S. policy of cooperation in the peaceful uses of nuclear energy, which has been followed since the passage of the Atomic Energy Act of 1954, is designed to deter proliferation by offering assistance to legitimate peaceful nuclear programs under effective controls, and thus reduce the incentives for countries to undertake independent nuclear programs which could readily lend themselves to peaceful uses.

Today, as a result of the Indian explosion and as more and more countries turn to nuclear energy to meet portions of their energy needs, the risk of proliferation seems greater than at any time in the past. Yet, the lesson of the twenty years since the U.S. embarked on a deliberate policy of cooperation in the peaceful uses of nuclear energy, I believe, is not that proliferation is inevitable, but that it can be avoided.

I should like to stress the importance which is attached by the Department of State as well as the entire Executive Branch to this goal. To achieve it the United States will continue to exert strong leadership in every possible way. This has been emphasized by Secretary Kissinger personally on a number of occasions, including his speech of September 23, 1974 before the United Nations General Assembly, when he stated, in part:

"In a world where many nations possess nuclear weapons dangers would be vastly compounded. . . . The challenge before the world is to realize the peaceful benefits of nuclear technology without contributing to the growth of nuclear weapons or to the number of states possessing them."

SAFEGUARDS

I have stated that the U.S. approach to avoiding proliferation has been to cooperate with other nations in the peaceful uses of nuclear energy under effective controls. A description of what these controls are and how they work may be of some interest.

Our cooperation in peaceful uses of nuclear energy takes place under agreements prescribed by the Atomic Energy Act of 1954. These agreements are submitted to the Joint Committee on Atomic Energy which, under amendments passed last year, must report them to the Congress within 30 days. Within a thirty-day period thereafter, the Congress may, by concurrent resolution, prevent the agreement from becoming effective.

Each of these agreements contains a guarantee by the other party, as prescribed by the Atomic Energy Act, that the materials and equipment made available under the agreement, will not be used for nuclear weapons or any other military purpose. These agreements also contain provisions, referred to as safeguards, which allow independent verification of the undertaking that material and equipment will not be diverted to military use, through broad rights of inspection in the territory of the cooperating country. The concept of verification of sovereign undertakings through such means as on-sight inspection was a novel one. The rights to make these inspections were achieved with considerable difficulty as a result of the bargaining power which the United States possessed as a provider of nuclear assistance.

The safeguards rights are extremely broad. Their central provision is one which allows U.S. personnel to have access to all places and data necessary to account for material, and to make any independent measurements which are necessary; in short, the right to carry out inspections in the territory of the country.

If the only objective of safeguards is to provide assurance that nuclear assistance provided by the U.S. is not diverted to unauthorized uses, this assurance could perhaps be secured more effectively by U.S. inspections than by any other means. However, the U.S. is not the only supplier, and few, if any, suppliers would be in a position to apply safeguards to their own cooperative activities. Moreover, not all countries would look upon bilateral safeguards arrangements between close partners as credible. Finally, it is of the greatest importance that the indigenous nuclear programs of non-nuclear weapons states be safeguarded, as the NPT provides. These considerations lead to the conclusion that only an international safeguards system can fulfill all the functions required in the field of verification of peaceful nuclear undertakings.

It was, therefore, U.S. intention from the outset that safeguards be conducted not directly by U.S. personnel, but rather by the International Atomic Energy Agency whose creation we proposed. The establishment of the IAEA was not accomplished, however, until 1957. In the meantime, to avoid delay in implementation of the cooperative program, the U.S. entered into bilateral agreements of the kind I have described, with provisions which allowed for transfer of the safeguards responsibility to the IAEA when this became possible.

Beginning in the late 1950's when significant quantities of nuclear material began to be supplied abroad until the mid-1960's when the responsibility for the application of safeguards was largely assumed by the IAEA, hundreds of on-sight inspections were conducted by U.S. safeguards personnel.

The purpose of these safeguards, as conceived from the outset, is to detect diversion of the nuclear materials to any unauthorized purpose. The safeguards are not in themselves a prohibition against unauthorized use of material purposes. They are a means for verifying that such a prohibition, contained in each of our agreements, is being complied with.

The U.S. has insisted from the outset that safeguards be conducted in such a way—both bilaterally and by the IAEA—as to verify by independent and objective means that peaceful use undertakings are being fulfilled. This approach of independent verification is the basic principle of the IAEA system which the U.S. has taken the leadership in developing.

The acquisition of broad rights of inspection on the territory of sovereign countries—whether undertaken bilaterally or by an international organization—represents an unprecedented step in the development of means for assuring that international undertakings are met. We believe that effective safeguards, that is safeguards which provide a high degree of assurance that any diversion will be detected on a timely basis, constitute an important deterrent to any such diversion. It would have been neither politically acceptable nor practical to grant to an international organization the power to correct or punish any violation which it detects through the use of force or police power.

The IAEA safeguards system is designed primarily to verify that governmental undertakings not to divert materials are being met. It accomplishes this through a system which includes three basic elements: materials accountability, containment and surveillance. If it could be conducted with absolute accuracy, materials accountability alone would provide an adequate means for assuring that no diversion has taken place. Unfortunately, this is not technically achievable. Similarly, containment and surveillance—measures to ensure that nuclear material is not removed from peaceful nuclear facilities by unauthorized means, or at unauthorized times or locations—would, if fool-proof, provide adequate assurance that no diversion is taking place. However, even when no diversion is detected by such measures, this does not constitute complete proof that none has occurred. Thus, an effective safeguards system must make use of a combination of these measures; materials accountability provides an objective measure of the amount of material unaccounted for. At the same time, containment and surveillance serve to expose any would-be violator to a high risk of detection, even for diversions much smaller than the limits of accuracy of the accountability measures.

The Agency safeguards system includes all three measures, and these are being implemented in practice. For example, at nuclear power reactors, the IAEA not only accounts for the fuel rods discharged through physical inventories to verify plant operating records, it installs seals on reactors and fuel storage areas to provide evidence of any unreported fuel removals, and makes use of tamper resistant cameras to detect any unauthorized fuel movements in the spent fuel storage area.

International safeguards have a different and more difficult task to perform than do domestic control systems. They cannot rely on the presumption that underlies domestic systems that no massive conspiracy, directed and organized from above—that is, by the government itself—is credible. At the same time, international systems can and do rely on the fact that a government itself has an overwhelming self-interest in ensuring that nuclear material in its possession is not diverted by persons unauthorized by itself. The two systems therefore complement each other. National systems have the basic responsibility for acquiring accountability data, which, in turn, is statistically verified by the international authority. Only in this way can the resources needed for effective international safeguards be kept within acceptable limits.

While international safeguards were designed principally to detect any diversion by governments, the effectiveness of these measures does not depend in any way on whether a would-be diverter is acting under national orders or as part of a subnational group. However, it is not the purpose of safeguards to prevent theft, seizures, or diversions by subnational groups, and inspectors have no grant of police powers to do so. This is the role of physical security systems—employing guard forces, physical barriers, and related measures—applied by national authorities.

The worldwide increase in terrorist activity has lent greatly added importance to the adoption of effective measures to prevent the theft or seizure of nuclear materials by dissident or criminal groups. There is little to be gained by debating whether diversion of nuclear material by national authorities or theft by subnational groups is the more serious and likely threat. Both are important and

both must be effectively guarded against. The numerous countries with which the U.S. has held consultations in this area, both bilaterally and multilaterally, agree with the importance of adequate physical security measures and are cooperating with the U.S. in applying such measures. The IAEA is also assisting in this effort in an important way by developing authoritative advice on the establishment of effective national physical security regimes.

Today, more than 50 IAEA inspectors are applying safeguards, including on-site inspection and other objective means of verification, to more than 60 major facilities in about 50 countries. As additional countries come under the safeguards regime of the Non-Proliferation Treaty, the Agency's workload will increase rapidly.

No practical system of safeguards can provide absolute assurance of the detection of small diversions. However, a safeguards system which exposes a would-be diverter to a high risk of detection can effectively fulfill its purpose of detecting and thereby deterring attempted diversions of significant quantities of weapons-usable material. We believe that the current safeguards system of the IAEA is as this capability.

The resources currently available to the IAEA to implement this system are in reasonable balance with present needs. However, with the expected rapid growth of requirements, providing the Agency with adequate resources to fulfill its responsibilities will present an important and continuing challenge. Similarly, the development of more effective and efficient safeguards techniques is an important task which requires strong support from the agency's members.

THE NON-PROLIFERATION TREATY

No matter how effective the non-proliferation policies of the U.S. and other suppliers may be, the problem of avoiding proliferation through indigenous nuclear efforts remains. It was largely in recognition of this fact that the U.S. formulated, proposed, and actively promoted the adoption of the Non-Proliferation Treaty. The NPT is designed to close the gap—a very real one in the case of many countries—that fissionable material suitable for use in nuclear explosives could be acquired through the essentially unassisted efforts of a particular nation. The NPT is, thus, a key element in achieving non-proliferation and the U.S. strongly supports the broadest possible adherence to this treaty.

Like any other important agreements, the NPT represents a bargain among its parties. In exchange for relinquishing its sovereign right to acquire nuclear explosives, a treaty party obtains the vastly increased security which flows from the relinquishment of this same right by other parties to the treaty. There are, however, other important benefits to membership in the treaty. In particular, Article IV of the treaty extends to non-nuclear weapons parties the assurance that they may undertake peaceful nuclear programs under the safeguards of the treaty and that in doing so, they will enjoy the fullest possible cooperation from the nuclear weapons states and other nations capable of providing assistance. The effective implementation of this provision will help ensure the broadest possible adherence to the treaty.

During the negotiations of the NPT, many nations expressed concern that the safeguards provision would interfere with the development of legitimate peaceful programs and would give an unfair advantage to the nuclear weapons states, whose peaceful programs are not required to be safeguarded under the treaty. To demonstrate its conviction that safeguards need not interfere, the U.S. undertook, during the treaty negotiations, voluntarily to make its own peaceful programs subject to IAEA safeguards. A similar offer was made by the United Kingdom.

In addition to its crucial importance in ensuring the adherence to the treaty of other advanced industrialized countries, implementation of the U.S. offer will provide the IAEA with an important means for improving its safeguards techniques and experience. It will also allow the U.S. to assert much more effectively its leadership role in the safeguards field.

RECENT DEVELOPMENTS

The current wide-ranging discussion of non-proliferation and safeguards was largely triggered by the Indian nuclear explosion of May 1974. This explosion was unique in that it employed fissionable material derived from facilities intended for peaceful purposes supplied through outside assistance.

The plutonium employed in the Indian explosion was derived from a natural uranium research reactor supplied to India by Canada. This arrangement was

developed at a very early stage of the programs of international nuclear cooperation, before clear-cut policies relating to peaceful uses undertakings and safeguards had been evolved. For this reason, while the arrangement contained peaceful guarantee (which India asserts it has met), it contained no safeguards to verify the use of the reactor. Thus, the Indian nuclear explosion in no way casts doubt on the effectiveness of safeguards, since none were involved.

In order to avoid any misunderstanding, I should like to stress that Canada has consistently been among the strongest and most effective supporters of the policy of non-proliferation and safeguards, and the approach used in this earlier arrangement has not been followed in subsequent Canadian agreements.

Much of the current discussion of safeguards and non-proliferation is focused on the proliferation risks involved in the international transfer of facilities or technology for reprocessing and enrichment of nuclear fuel. It is these facilities which have the capability of producing fissionable material in a form suitable for use in nuclear explosives. There are, however, important distinctions between them.

Reprocessing technology has long been unclassified and, at least in its general outlines, is widely available. In contrast, the technology of uranium enrichment has remained for the most part classified and is not generally available. In the early 1960's, at U.S. initiative, agreement was reached among interested countries to place all future work on the centrifuge process, then underway in several countries under strict classification. Moreover, unlike reprocessing, the processes and equipment employed in uranium enrichment processes are far from conventional. Thus, there is no readily available basis for undertaking uranium enrichment in most countries.

There are also important differences among the various enrichment processes and reprocessing in relation to the readiness with which weapons useable material is obtainable. One of the purposes of reprocessing is to recover plutonium in useable form. On the other hand, an enrichment plant for producing light water power reactor fuel need not produce highly enriched uranium. The conversion of enrichment plants designed to produce low enriched uranium to the production of highly enriched material is not impossible, but it is, for some processes such as gaseous diffusion and the jet-nozzle, very difficult.

Both reprocessing and enrichment facilities present difficult safeguards problems. Effective safeguards at large facilities of this type will require the continuous application of safeguard measures. Even with this approach, absolute accounting for all produced material cannot be achieved, but in a properly designed system making effective use of containment and surveillance measures even small diversions attempts can be subjected to a high risk of detection.

The transfer of reprocessing or enrichment facilities or technology presents a further proliferation problem. Even if the facilities built under a cooperative arrangement are safeguarded, the technology transferred might be used in future unsafeguarded facilities. To meet this problem, arrangements which call for the application of peaceful use undertakings and safeguards to any facilities built by the recipient in which transferred technology is employed are being developed. The effective implementation of this principle can make an important contribution to the achievement of nonproliferation, since it can result in bringing under safeguards facilities which, in time, might have been built independently by the country receiving such technology.

Because of the proliferation potential of reprocessing and enriching facilities the U.S. does not favor the widespread introduction of these facilities among a number of nations and has placed the transfer of such facilities or their technology under strict control. One logical way to minimize the number of reprocessing and enrichment facilities constructed, and, at the same time, to reduce their proliferation risks in other ways is through the development of multinational enterprises meeting regional needs for these two fuel cycle services. By providing for multinational management and staffing of such facilities, this approach complements safeguards in detecting any diversion and provides additional political constraints against a withdrawal or termination of safeguards at such facilities.

In recognition of the attractiveness of the regional fuel center concept, the IAEA is currently undertaking a feasibility study of such centers. The U.S. is strongly in favor of this study and urges other IAEA member states to give it their full support.

THE ROLE OF SUPPLIERS

It is clear that success of non-proliferation efforts is critically dependent on the policies not simply of the U.S. but of all major suppliers. In recognition of this, intensified efforts to achieve supplier coordination was specifically called for in Secretary Kissinger's UN speech of last year. The goal of non-proliferation can be more effectively realized if suppliers adopt certain restraints which go beyond the NPT undertaking to supply nuclear materials and equipment only under safeguards.

While the U.S. has enjoyed a dominant position as a nuclear supplier, it has never had the exclusive capability to provide nuclear assistance. The first nuclear power reactors sold in international commerce were natural uranium sold by Great Britain. Natural uranium reactors have also been sold by France, Germany, and Canada.

The supply of enriched uranium itself is undergoing major changes. Even at the inception of the international program in 1955, the U.S. did not have a complete monopoly in enriched uranium supply. Since then, a tripartite consortium of Great Britain, the Netherlands, and West Germany has begun production for commercial use by the centrifuge process on a pilot scale. France, with substantial investments from other countries, is undertaking the construction of a commercial scale gaseous diffusion plant scheduled for completion in 198-, and a second plant will be built if market conditions warrant. The Soviet Union has entered the world enrichment market on a large scale. Additional enrichment efforts are being undertaken or planned by South Africa and by West Germany in association with Brazil, using new processes. Japan, Australia, and Canada are considering the establishment of enriching facilities.

The superior technical and economic characteristics of enriched uranium reactors, coupled with the dependable supply of enriched uranium assured by the U.S. enrichment capacity and distribution policies, led to the widespread adoption of the light water enriched uranium reactor. The continued attractiveness of S.-type light water reactors is dependent upon the continued capability of the U.S. to serve as a highly reliable supplier of enriched uranium. President Ford's recent proposal on expansion of U.S. uranium enrichment capacity is the key element in enabling the U.S. to fill this role.

The U.S. policy of cooperation in peaceful uses of nuclear energy has, in addition to its non-proliferation objectives, other important goals. The economic and technical interdependence which results from the supply of U.S. reactors and clear fuel to other nations can strengthen political ties and can have an important stabilizing influence on international relations. The sale of nuclear equipment and services is of substantial economic benefit to the U.S., with sales to date estimated at more than \$2 billion and cumulative sales through 1990 estimated at over \$40 billion.

Competition among suppliers on price, quality and other commercial considerations is proper and desirable. Competition on safeguard arrangements is reckless. In his speech of July 14 in Milwaukee, Secretary Kissinger observed that "it is crucial that supplier and user nations agree on firm and clear export standards and strengthened IAEA safeguards."

The policies which we and other suppliers follow in the immediate future will have a profound effect on whether proliferation is contained or whether it gathers momentum.

The Department of State will continue to give the problem of proliferation the highest priority and exert every effort to ensure that the long-standing U.S. policy of non-proliferation is successfully implemented.

This concludes my prepared statement, Mr. Chairman, and I will be pleased to respond to any questions which the Committee may have.

PREPARED STATEMENT OF DR. ABRAHAM S. FRIEDMAN, DIRECTOR, DIVISION OF INTERNATIONAL PROGRAMS, U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Mr. Chairman and members of the committee, I am pleased to appear on behalf of the Energy Research and Development Administration (ERDA) to testify on the subject of nuclear exports.

Mr. name is Abraham Friedman. I am the Director of ERDA's Division of International Programs and, prior to the creation of ERDA on January 19 of this year, was director of the Atomic Energy Commission's Division of International Programs. My university training was in chemistry, chemical engineering and physics, and I have been associated with the country's nuclear energy program since the Manhattan Project. I joined the AEC's international program in 1962 as the Commission's scientific representative in our embassy in Paris and have been involved in the international program ever since.

In this statement I will attempt to outline the general framework in which U.S. activities for international cooperation in the nuclear field are carried out, the policies which govern our cooperation, and an overview of U.S. and foreign exports of materials and equipment. Since Mr. Kratzer has provided the Subcommittee with a detailed statement on the background and rationale for U.S. cooperation in this field, I will keep my statement brief and be prepared to respond to questions members of the Subcommittee may have.

The Atomic Energy Act of 1954, as amended, provides, in Section 3.e. for:

"a program of international cooperation to promote the common defense and security and to make available to cooperating nations the benefits of peaceful application of atomic energy as widely as expanding technology and consideration of the common defense and security will permit."

In accordance with the provisions of the Atomic Energy Act, the United States Government has carried out and promoted a broad program of international cooperation in the peaceful application of atomic energy for the past 20 years. The program has provided for the exchange, with other nations, of information on the application of nuclear technology for peaceful purposes and for the sale abroad of reactors and nuclear fuels for both research and power reactors. These activities have largely evolved under the terms of Agreements for Cooperation in the civil uses of atomic energy negotiated between the U.S. and other nations or groups of nations pursuant to Section 123 of the Atomic Energy Act. There are now in effect 30 such agreements with 29 countries, as well as one with the International Atomic Energy Agency (IAEA) and two with the European Atomic Energy Community (Euratom). A list of these agreements is attached.

The principle purpose of the Agreements for Cooperation is to provide a framework, under the Atomic Energy Act, to: (a) permit issuance of licenses for the export of nuclear reactors ("Utilization facilities" as defined in Title 10 of the Code of Federal Regulations, Part 50) by U.S. commercial vendors; (b) permit issuance of licenses for the export of special nuclear material (SNM), e.g., uranium enriched in the isotope U-235; and (c) permit ERDA, or a future alternative U.S. source, to enter into and implement contracts for the supply of SNM or uranium enrichment services. These Agreements do not in and of themselves normally represent a legal commitment by ERDA to conclude such enriched uranium supply contracts or for the Nuclear Regulatory Commission (NRC) to approve an export license application.

As prescribed in Section 123 of the Act, an Agreement for Cooperation must include:

- (1) The terms, conditions, duration, nature and scope of the cooperation;
- (2) A guarantee by the cooperating party that security safeguards and standards as set forth in the agreement will be maintained;
- (3) A guarantee by the cooperating party that any material to be transferred pursuant to the agreement will not be used for atomic weapons or for any other military purpose; and
- (4) A guarantee by the cooperating party that any material transferred under the agreement will not be transferred to unauthorized persons or beyond the jurisdiction of the cooperating party except as specified in the agreement.

With regard to the process of negotiating and concluding Agreements for Cooperation, or amendments thereto, draft texts are typically prepared by ERDA and submitted to the Department of State for review and comment. The intent of the Executive Branch to enter into the negotiation of an Agreement is brought to the attention of the JCAE. After an agreed text has been developed, it is presented to the foreign Party for consideration on an *ad referendum* basis. After *ad referendum* agreement is reached by the parties, the text must be approved by the ERDA Administrator and the Department of State.

The approved text is then initiated by representatives of ERDA, the State Department and the other Party to signify agreement on the text language (subject to further approvals) and submitted by ERDA to the President for his approval. Before approving and authorizing the execution of the proposed Agree-

ment, the President must determine in writing "that the performance of the proposed Agreement will promote and will not constitute an unreasonable risk to the common defense and security." Following this determination the Agreement is formally signed by representatives of ERDA and the State Department on behalf of the United States) and the other Party.

The signed text is then submitted to the United States Congress, where it must lie for a statutory period. Prior to enactment of P.L. 93-485 on October 26, 1974, amending Section 123.d. of the Atomic Energy Act, all Agreements for Cooperation or amendments thereto were submitted to the Joint Committee on Atomic Energy and lay for a statutory 30-day period. Under P.L. 93-485, all Agreements involving significant cooperation—that means, assistance involving reactors producing more than 5 thermal megawatts—must lie before the Congress for 60 days. Agreements involving reactors producing less than 5 thermal megawatts must lie before the JCAE for 30 days. During these periods Congressional hearings on proposed agreement are generally held by the JCAE. If, during the 60-day period, the Congress adopts a concurrent resolution stating in substance that it does not favor a proposed Agreement, the Agreement cannot become effective. If the Congress takes no such action or adopts a concurrent resolution favoring the proposed Agreement, the final step which brings the Agreement into force is an exchange of notifications between the Parties (by the Department of State on the U.S. side) advising that all their respective statutory and constitutional requirements have been completed.

Agreements contain limitations on the total enriched uranium (U-235) which may be transferred under the Agreement. Requests for significant quantities of uranium enriched to greater than 20% in U-235, e.g., over 5 kilograms of contained U-235, are considered on an ad hoc basis and, at a minimum, must satisfy the Executive Branch of the Government as to economic or technical merit and as to acceptability of applicable physical security measures to protect the materials. Further, transfers of material and equipment can take place only within the period of the Agreements.

With respect to safeguards on U.S.-supplied material and equipment exported under Agreements for Cooperation, the United States looks to the International Atomic Energy Agency to apply safeguards to source and special nuclear material supplied by the United States under Agreements for Cooperation, and to such material which is used in connection with U.S.-supplied facilities. The agreements for cooperation with other countries include a provision expressly calling for this. Pursuant to such a provision, the U.S., the other party, and the IAEA conclude a trilateral safeguards agreement. Our Agreements for Cooperation also give us the right to carry out bilateral safeguards on U.S. supplied material. Where safeguards rights are suspended while IAEA safeguards are in effect pursuant to the trilateral agreement.

Under the 1970 Treaty on Non-Proliferation of Nuclear Weapons (NPT), the U.S. has undertaken not to supply source or special nuclear material and certain equipment to non-nuclear weapon states unless IAEA safeguards will be applicable. Under the Treaty a party can conclude a safeguards agreement directly with the IAEA. This is an alternative approach to the above-mentioned trilateral arrangement for IAEA safeguards on U.S.-supplied material. U.S. safeguards rights under a bilateral agreement for cooperation with a state having an IAEA safeguards agreement pursuant to the NPT would similarly be suspended as in the case of an IAEA trilateral safeguards agreement. Under neither approach, however, is the agreement for cooperation replaced; rather, the safeguards arrangements with the IAEA serve to implement an aspect of the agreements for cooperation, with the mutual agreement of the United States and the other bilateral parties.

In reviewing any proposed export case, the Executive Branch considers all relevant aspects, including U.S. obligations under the Non-Proliferation Treaty. The advice of all interested governmental agencies is sought and, on significant U.S. policy matters, interagency studies are conducted and presented to the President for decision. The recommendations of the Executive Branch are provided to the Nuclear Regulatory Commission in connection with their consideration of license application for the export of utilization or production facilities and special nuclear material.

Control of nuclear assistance, in addition to that noted above is based upon provisions of the Atomic Energy Act. The principal restriction on the dissemination by private U.S. persons and companies of unclassified nuclear information, as well as other assistance in the nuclear field, is set forth in Section 57.b of

the Act, which states that it shall be unlawful for any person to directly or indirectly engage in the production of any special nuclear material outside of the United States except (1) under an agreement for cooperation made pursuant to Section 123, or (2) upon authorization by the Administrator of ERDA after a determination that such activity will not be inimical to the interest of the United States. Pursuant to the statutory provision, the AEC, following initiation of the Atoms for Peace Program in the mid-1950's, issued a regulation which provided a general authorization for U.S. persons and companies to engage in unclassified activities in "free world" atomic energy programs. For a number of years after the promulgation of this regulation the foreign activities in which Americans participated under the authorization did not appear to present significant problems. However, in recent years, an increase in certain types of proposed activities (e.g., unclassified assistance in uranium isotope separation, chemical processing, and production of heavy water) caused the AEC to reconsider this authorization. This increase was accentuated by the fact that several countries requested the assistance of U.S. industry in conducting activities in these areas, including requests for assistance in enrichment and chemical processing, which raised national security and international safeguards issues.

In light of these circumstances, and following entry into force of the NPT the AEC, in 1972, amended its regulations to require specific authorization for any person under the jurisdiction of the United States to directly or indirectly engage in certain activities outside of the United States in the fields of uranium enrichment, chemical processing and heavy water production. This change was designed to assure that U.S. policy with regard to assistance to foreign nuclear energy programs in these areas, along with U.S. obligations under the Treaty on the Non-Proliferation of Nuclear Weapons, would be satisfactorily met.

In addition to the items licensed by NRC, there are many other materials and equipment which have potential atomic energy uses that are controlled by the Department of Commerce and the Office of Munitions Control of the Department of State. ERDA provides advice to these agencies regarding the potential significance of a proposed export to a nuclear weapons program and our recommendation as to whether the export should be permitted. We participate in interagency committees developing U.S. policy and reviewing such export applications.

Also, there is the group known as COCOM (Coordinating Committee) composed of NATO countries, except Iceland, plus Japan, that has agreed to embargo the export of strategic items to Soviet Bloc countries. There are many atomic energy and atomic energy related items on the COCOM list. ERDA participates in the development and updating of these lists and a review of individual applications.

U.S. cooperation with other nations and groups of nations is undertaken in conformance with the Non-Proliferation Treaty. The Treaty calls for the exchange of equipment, materials and scientific and technological information in the peaceful uses of nuclear energy, subject to the express condition that source and special nuclear material so transferred, or utilized with equipment or other material transferred, shall be subject to IAEA safeguards. Moreover, the non-nuclear weapons state (NNWS) parties to the Treaty pledge not to acquire or manufacture nuclear weapons or other nuclear explosive devices, and the U.S., as a nuclear weapons state, has pledged not to provide any assistance toward the acquisition or manufacture of such a capability. Actually, these principles have formed the basis of our international cooperative program since its inception, which has been designed to share the benefits of the peaceful applications under conditions to inhibit any use for non-peaceful purposes.

The U.S., however, is only one of many suppliers, and cannot unilaterally inhibit proliferation by controls on exports. It is important, therefore, that all suppliers act on similar principles, to the maximum extent possible. Significant steps have been taken in this direction. For example, the U.S. and other major suppliers have agreed on a minimum list of nuclear materials and equipment which, as a

condition of export, must be subject to IAEA safeguards and as a commitment by the recipient country not to employ such transfers for any nuclear explosive purpose. In addition, there is a growing recognition among suppliers, as well as recipient countries, that adequate physical security measures (particularly with respect to the transport and use of sensitive materials) are important to prevent or inhibit theft or other malicious acts. Consultations are continuing with other suppliers concerning the need to adopt and strengthen common supply policies aimed at assuring that nuclear assistance does not lead to proliferation. Many of the major suppliers are also parties or signatories to the NPT. This provides a common base for approaching the problem. These countries include the United Kingdom, Canada, the U.S.S.R., and the Federal Republic of Germany. France is not a party to the NPT, but has indicated it would behave as though it were.

The U.S., until the past few years, essentially dominated the nuclear export market. This is no longer the case. Of the 77 known nuclear power plants operating, under construction or on order abroad, U.S. firms are major suppliers for 55, with the others being supplied by Germany, France, Canada, Sweden and the U.S.S.R. Revenues to the U.S. from these sales are expected to amount to approximately \$3.5 billion. Looking to the future, it may be expected that U.S. firms, with their broader domestic market base, greater experience in production, and technological excellence, plus a larger production capability, will continue to supply a major share of the export market. Other nations, however, particularly Germany, France, Canada, and perhaps later, Japan, may become even stronger competitors in the future. The extent of the market penetration by these other suppliers may be limited to some extent by their capability to produce in excess of their own domestic power program requirements, many of which have adopted ambitious programs prompted by the desire to lessen their dependence on imported oil. The Soviets are not perceived to be a significant nuclear power plant supplier outside of the Soviet Bloc.

With respect to the supply of enriched uranium, the U.S. continues to be the largest exporter of uranium enrichment services. It will, however, increasingly share the market with the U.S.S.R., the French-led EURODIF group, the FRG/Dutch/UK Ureenco Centec, and, probably in the future, South Africa. It is projected that the U.S. will continue to be nearly the sole supplier of enrichment services through the 1970's, with the other suppliers beginning to have to take up a portion of the market commencing in 1979 or 1980. Revenues to the U.S. Government from the sales of enrichment services through 1974 amount to approximately \$800 million and are projected by 1985 to be about \$7 billion.

Thus, the U.S. continues to be the major supplier of nuclear equipment and materials, and can be expected to continue in this position for the foreseeable future. Several other suppliers, however, share in the expanding export market, and this trend will undoubtedly continue and grow in the future.

It has been—and is—our conviction that U.S. cooperation with other countries in the supply of reactors and fuel can be undertaken under conditions that provide assurance that such cooperation will be limited strictly to peaceful applications. Moreover, the U.S. will continue to consult with other suppliers on the importance of employing common policies to assure that assistance does not contribute to proliferation.

This completes my testimony, Mr. Chairman. I will be glad to respond to questions the Committee may have.

AGREEMENTS FOR COOPERATION IN THE CIVIL USES OF ATOMIC ENERGY

Country	Scope	Effective date	Termination date
A. Bilaterals with individual countries:			
Argentina	Research and power	July 25, 1969	July 24, 1999
Australia	do	May 28, 1957	May 27, 1997
Austria	do	Jan. 24, 1970	Jan. 23, 2014
Brazil	do	Sept. 20, 1972	Sept. 19, 2002
Canada	do	July 21, 1955	July 13, 1980
China, Republic of	do	June 22, 1972	June 21, 2014
Colombia	Research	Mar. 29, 1963	Mar. 28, 1977
Finland	Research and power	July 7, 1970	July 6, 2000
Greece ¹	Research	Aug. 4, 1955	Aug. 3, 1974
India	Power (Tarapur)	Oct. 25, 1963	Oct. 24, 1993
Indonesia	Research	Sept. 21, 1960	Sept. 20, 1980
Iran	do	Apr. 27, 1957	Apr. 26, 1979
Ireland	do	July 9, 1958	July 8, 1978
Israel	do	July 12, 1955	Apr. 11, 1977
Italy	Research and power	Apr. 15, 1958	Apr. 14, 1978
Japan	do	July 10, 1968	July 9, 2003
Korea	do	Mar. 19, 1973	Mar. 18, 2014
Norway	do	June 8, 1967	June 7, 1997
Philippines	do	July 19, 1968	July 18, 1998
Portugal	do	June 26, 1974	June 25, 2014
South Africa	do	Aug. 22, 1957	Aug. 21, 2007
Spain	do	June 28, 1974	June 27, 2014
Sweden	do	Sept. 15, 1966	Sept. 14, 1996
Switzerland	do	Aug. 8, 1966	Aug. 7, 1996
Thailand	do	June 27, 1974	June 26, 2014
Turkey	Research	June 10, 1955	June 9, 1981
United Kingdom	Research and power	July 21, 1955	July 20, 1976
Do	Power	July 15, 1966	July 14, 1976
Venezuela	Research and power	Feb. 9, 1960	Feb. 8, 1980
Vietnam (Republic of)	Research	Julg 1, 1959	June 30, 1979
B. Bilaterals with international organizations:			
European Atomic Energy Community (EURATOM)	Joint nuclear power program	Feb. 18, 1959	Dec. 31, 1985
EURATOM	Additional agreement to joint nuclear power program	July 25, 1960	Dec. 31, 1995
International Atomic Energy Agency (IAEA)	Supply of materials, etc.	Aug. 7, 1959	Aug. 6, 2015

Source: ERDA.

¹ Superseding, research and power agreement in abeyance; U.S. material covered by IAEA (NPT) safeguards and Greek "peaceful uses" guarantee.

PROTESTS CONCERNING GERMAN-BRAZIL NUCLEAR ACCORD

Senator SYMINGTON. Last month the State Department testified before the Foreign Relations Committee that the United States had protested the German-Brazilian nuclear accord. Later the same month, the Chancellor of West Germany, Mr. Schmidt, denied that the United States had made any protests whatsoever; and this is still the German Government position.

Could you help clarify for the record exactly what protests, if any, were made, and by whom, and when, and what concerns were expressed?

STATEMENT OF GEORGE S. VEST, DIRECTOR, BUREAU OF POLITICO-MILITARY AFFAIRS, DEPARTMENT OF STATE

Mr. VEST. If I may start off on that one, to begin with I can give you the chronology in great detail to provide a sense of what has actually transpired.

Senator SYMINGTON. If you would give us a summary of it. Incidentally, do you have any telegrams or letters, recorded telephone conversations showing you protested anything?

Mr. VEST. I do not have those with me, sir.

Senator SYMINGTON. Would you file them for the record when you get them?

Mr. VEST. Yes, sir.

[The information referred to is classified and in the committee files.]

Senator SYMINGTON. Either the State Department is not telling the truth, or the German Government is not telling the truth.

Mr. VEST. I will start by saying that I am not sure what the German Government is saying, since what I have had my attention drawn to were press reports.

Senator SYMINGTON. What we have are direct statements by Chancellor Schmidt.

BEGINNING OF DISCUSSIONS WITH GERMAN AUTHORITIES

Mr. VEST. To give some picture of the history, we began the discussions of this subject with the German authorities in 1974 when we first heard of the projected sale. To give you the main points, when we asked for information from the foreign office in February 1975, we were informed of the general ideas they had in mind concerning a Brazil FRG (Federal Republic of Germany) sale.

Senator SYMINGTON. February 1975?

Mr. VEST. February 1975. In March 1975, the Director of the Arms Control and Disarmament Agency, together with representatives—

Senator SYMINGTON. Who was that?

Mr. VEST. Fred Iklé—together with representatives of the State Department met with the German Ambassador here and pressed him for further consultations with us because of the implications of such a sale.

Senator SYMINGTON. What do you mean by that? Do you mean for the first time they wanted a uranium enrichment plant?

Mr. VEST. Because of the implications of enrichment and reprocessing being sold to Brazil.

Senator SYMINGTON. As part of the deal.

Mr. VEST. As part of the deal.

Senator SYMINGTON. Which the Brazilians requested.

Mr. VEST. That is correct.

Senator SYMINGTON. And you explained to him that we could not accept that because it was against our policy.

Is that correct?

Mr. VEST. That is correct, sir.

Senator SYMINGTON. The Germans did accept it, then, did they not?

Mr. VEST. The Germans then gave us a written response after that.

Senator SYMINGTON. They took the deal we turned down. Is that correct?

Mr. VEST. I would have to ask Mr. Kratzer to describe what we did and what we did not do in relation to Brazil, sir.

Senator SYMINGTON. As we understand it—

Mr. VEST. In general terms, this was a matter in which one of our companies was interested. We were not prepared to approve enrichment and reprocessing.

Senator SYMINGTON. That is what we understand. Then the Germans decided to approve enrichment and reprocessing. Correct?

Mr. VEST. Yes, sir.

Senator SYMINGTON. That lost us billions of dollars of work and tens of thousands of jobs, according to Westinghouse.

Is that correct?

Mr. VEST. I believe that is.

DEPUTY SECRETARY INGERSOLL'S MEETING WITH GERMAN AMBASSADOR

A further meeting was held in March of 1975 as well with Deputy Secretary Ingersoll, again with the German Ambassador.

Senator SYMINGTON. Ambassador Von Staden?

Mr. VEST. Yes. Again we went over the case and urged that the matter not be finalized.

Senator SYMINGTON. We went over the case. Who was "we"?

Mr. VEST. Mr. Ingersoll. Mr. Ingersoll discussed the matter with the German Ambassador and argued against a sale of this nature.

Senator SYMINGTON. Did he ask them not to make the sale?

Mr. VEST. I am sorry, sir. I would have to get the details on that for you.

[As of the date of publication the information referred to had not been supplied.]

Senator SYMINGTON. What did he urge them to do if he did not ask them not to make the sale?

Mr. VEST. He urged them not to complete the whole deal. Whether he took out one section and said do not sell this, sell that, I do not have the details.

Senator SYMINGTON. Let us get it straight. I know Mr. Ingersoll. He was a former industrialist. He would be glad to have 20,000 jobs in this country, would he not? Therefore, he must have been asking the Germans not to do what we told the Brazilians we would not do.

Is that not correct? Would you put another interpretation on it?

Mr. VEST. No.

Senator SYMINGTON. Let us try to stay on beam with the facts.

Mr. VEST. We also offered at that time to send a technical team over to Bonn to explain exactly the nature of our reservations, which in April we did.

I would like to go right from there to the next point, which is when President Scheel and Foreign Minister Genscher came to this country in June.

REACTION TO U.S. TECHNICAL TEAM'S TRIP TO BONN

Senator SYMINGTON. Before you do that, you sent the team over to Germany in April. What was the reaction to that?

Mr. VEST. They agreed to delay awhile. That is all.

Senator SYMINGTON. They agreed to delay.

Mr. VEST. To delay any final signature.

Senator SYMINGTON. How long did they agree to delay?

Mr. VEST. Nothing specific.

Senator SYMINGTON. Agreed to delay maybe until the next night?

Mr. VEST. No, sir.

Senator SYMINGTON. I am asking you.

Mr. VEST. It was agreed that they would delay. I assumed they would delay for 1 or 2 months.

Senator SYMINGTON. That is what you assumed?

Mr. VEST. That was the general assumption on both sides.

Senator SYMINGTON. From when in April until when in June?

Mr. VEST. The general assumption was that they would not make any decision until the end of that month.

Senator SYMINGTON. Until the end of what month?

Mr. VEST. The end of April.

Senator SYMINGTON. I thought you said 2 months.

Mr. VEST. This was the very beginning of the month. We did not know the exact time they might act. We did not expect anything during the month.

Senator SYMINGTON. About a month.

U.S. VISIT OF FOREIGN MINISTER GENSCHER AND PRESIDENT SCHEEL

Mr. VEST. Right. In June Foreign Minister Genscher was here with President Scheel. At that time Secretary Kissinger and Foreign Minister Genscher discussed the sale. Mr. Kissinger again expressed the U.S. concern over the sale of reprocessing and enrichment.

Senator SYMINGTON. Expressed concern. He asked them not to do it; did he not?

Mr. VEST. I assume so. I was not present when the conversation took place.

Senator SYMINGTON. Have you seen the testimony of the State Department before this committee? Were you present at that meeting?

Mr. VEST. No, sir; I was not.

Senator SYMINGTON. At that meeting it was stated that the State Department urged the Germans not to make the sale.

Mr. VEST. Not to sell. I believe, reprocessing and enrichment. I am making a distinction between the sale of reprocessing and enrichment on the one hand, and reactor technology on the other hand. Those are two separate components of the total sale.

Senator SYMINGTON. I understand.

Mr. VEST. The Secretary expressed our concern with the first element of the sale. It was publicly recorded. There were public statements afterwards. Mr. Kissinger was quoted in the press as saying, "We talked the problem over. We have had in the course of the last few months many opportunities to bring our point of view to the attention of the Federal Government. The Foreign Minister once again stated to me the position of the Federal Government. We had an exchange of opinions." So, Mr. Kissinger himself publicly, with Mr. Genscher right there, did mention the fact that we have repeatedly brought our position to the attention of the German Government. The two of them on June the 16th, indeed, had discussed it.

Senator SYMINGTON. What was the position that Mr. Kissinger brought before them? What did he say?

Mr. VEST. Mr. Kissinger, the Secretary's position, again, as far as I know—

STATE DEPARTMENT'S POSITION CONCERNING GERMAN SALE

Senator SYMINGTON. I will put you under oath if you want to go under oath. You keep talking about concern. What was the State Department's position when they talked to the Germans about it?

The State Department has testified to us that they protested the deal. They wanted to try to stop it. The German Chancellor says that is not true. He said not a single protest came from anybody in the American Government; and it has been reported widely that it was not brought up by anybody in this administration when Mr. Scheel came to this country.

Mr. VEST. I have no way of knowing what the basis for the German Foreign Minister's statement is. If I were under oath, Senator, I could not say for sure exactly what two foreign ministers say together in the privacy of a room.

Our position and the one we have made clear, the one which the Secretary alluded to, was we were opposed to the sale of reprocessing and enrichment to Brazil.

Senator SYMINGTON. Now then, we are getting down to cases. In other words, the State Department told the German Government that they opposed this deal which we had refused for ourselves because it was a uranium enrichment process, technological sales.

Is that correct?

Mr. VEST. Yes, sir.

Senator SYMINGTON. Thank you.

WHAT WESTINGHOUSE DID

This past Friday representatives of the Westinghouse Corp. testified before this subcommittee that Westinghouse was actively seeking a major nuclear sale to Brazil before the Germans entered the picture but that U.S. policy prevented the transfer of a complete nuclear fuel cycle, so the Brazilians then turned to West Germany.

In effect, that is what you have told us, is it not?

Mr. VEST. When you start talking about what Westinghouse did or did not do, I should turn to one of the other witnesses and let them speak to that, sir. I do not know.

Senator SYMINGTON. Fine.

STATEMENT OF MYRON B. KRATZER, ACTING ASSISTANT SECRETARY, BUREAU OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS, DEPARTMENT OF STATE

Mr. KRATZER. What you have said, Mr. Chairman, is entirely correct. One important point that has bearing on that should be added. That is at an earlier stage of the Westinghouse Brazil discussions sometime in the summer of 1974. The United States reached a situation where we could no longer enter into additional uranium enrichment supply contracts at that point.

We, the U.S. Government, notified the Brazilian Government of our inability to go ahead with two firm supply contracts for enriched uranium that would have been used in connection with the sale by Westinghouse. We offered the Brazilian Government instead what we refer to as conditional contracts.

That was quite a setback in the minds of the Brazilians, in spite of the fact, I might add, that at that same time a Presidential statement was made that the conditional contracts would be fulfilled. I am quite sure that event had an important bearing on the attitude of Brazil

toward the purchase of U.S. reactors, and was part of the motivation of their more actively seeking to do business elsewhere.

Senator SYMINGTON. What other countries did you give that message to besides Brazil?

Mr. KRATZER. I cannot give you a complete list. We could submit that for the record. There were some 30 contracts which had to be treated in that way. Dr. Friedman of ERDA may have the information with him. If not, we will submit it for the record.

PROLIFERATION OF NUCLEAR CAPABILITY

Senator SYMINGTON. Based on considerable experience in this field of nuclear weaponry, to my mind the most dangerous thing the world faces today is a proliferation of nuclear arms to more and more countries.

Having just come back from Vienna and Geneva where I was a couple of weeks ago with staff members of the Committees on Armed Services, Foreign Relations, and Joint Atomic Energy, the three committees involved of which I was a member, it begins to look to me as if our present efforts at controlling nuclear proliferation are more form than substance; and that as we watch various nuclear transactions take place around the world, the atoms for peace plan appears to be increasingly transformed into an atoms-for-possible-war plan. Pretty soon, with all this proliferation of nuclear materials, equipment, and technology, it is going to be a relatively simple matter for many countries to make atomic weapons if they so desire.

You would agree to that, would you not?

Mr. KRATZER. It is within the capability of a number of countries today to produce fissionable material for weapons with relatively little, and in many cases, without any outside assistance: yes, sir.

UNFILED IAEA POSITION

Senator SYMINGTON. I wonder why we do not pay more attention to the IAEA. Several months ago the U.S. permanent representative to the IAEA, Mr. Porter, left this position: he is now with Westinghouse; and in fact he was a witness here last week. We got a lot of information from him.

However, a successor to Mr. Porter has not been named. Does not the State Department consider the IAEA important enough to fill the position?

Mr. KRATZER. Mr. Chairman, Mr. Porter, Ambassador Porter, was the U.S. Resident Representative to the International Atomic Energy Agency, a very able one, and he served under Ambassador Tate, who was our Representative, not our Resident Representative, but our senior Representative to that Agency.

Senator SYMINGTON. He does not live there. He lives in this country.

Mr. KRATZER. He attends the important meetings of the Board of Governors.

Senator SYMINGTON. Three, four times a year, I am told.

Mr. KRATZER. Four times a year; yes, sir.

Senator SYMINGTON. Do you know of any other important corporation or Government agency in which the No. 1 man who is responsible visits the setup three or four times a year?

Mr. KRATZER. The nature of the Agency's day-to-day business is such that it can be handled more effectively by a career officer such as Ambassador Porter was.

Senator SYMINGTON. Why do you not fill it?

Mr. KRATZER. This will be filled very soon, sir.

Senator SYMINGTON. Very soon? How soon?

Mr. KRATZER. I can report to you it is in advanced stage of consideration. I think within a matter of days.

Senator SYMINGTON. I hope it is. It certainly has created a lot of disorganization in what is generally considered to be the Agency that monitors the effectiveness of nuclear proliferation control.

Mr. KRATZER. It is a very important post.

Senator SYMINGTON. If it is a very important post, why do you not feel it has been vacant for a month?

Mr. KRATZER. It will be filled very soon.

Senator SYMINGTON. Would you like to tell us when?

Mr. KRATZER. No; I cannot, sir, because that is an appointment which is made by the administration.

Senator SYMINGTON. No name has been sent up to us.

Mr. KRATZER. No, sir; I think I can say in a matter of days you will have it.

IAEA ROLE CONCERNING NUCLEAR PROLIFERATION

Senator SYMINGTON. The problem is that everybody sort of thought that the International Atomic Energy Agency, IAEA, was in effect controlling this whole question of proliferation. The facts indicate exactly the opposite. It has no control whatever over nuclear proliferation, as evidenced by the deals that have been made by countries that presumably are our friends. Of course, the experience that some consider unfortunate is the Canadian deal with India.

Incidentally, the Canadians are working with the Argentines, are they not?

Mr. KRATZER. Canada has sold a nuclear reactor to Argentina. That is under construction. That reactor, like the earlier reactor that Argentina purchased from West Germany is under safeguards of the International Atomic Energy Agency.

Senator SYMINGTON. There is not any force behind those safeguards.

Mr. KRATZER. I would like to comment on what the Agency's role in this area is in connection with proliferation. The Agency has a very important role to fill, in my view. That role is to apply what we call safeguards which, if done effectively, have the capability of determining whether any material is being diverted to unauthorized uses, nuclear weapons or nuclear explosives.

Senator SYMINGTON. Getting back to Brazil, they not only have not ratified, they have not even signed the Non-Proliferation Treaty.

Mr. KRATZER. The role of the agency in applying safeguards is not one that necessarily depends on the country signing the Non-Proliferation Treaty.

HOW COULD IAEA STOP BRAZIL FROM BUILDING NUCLEAR WEAPONS?

Senator SYMINGTON. Brazil has a lot of uranium in its own country. Suppose after it gets the technology it says thank you very much, and goes ahead and builds nuclear weapons. What could the IAEA do to stop that?

Mr. KRATZER. If a country has not signed the Non-Proliferation Treaty, and Brazil is such an example, and undertakes a nuclear program on its own with its own resources, using technology which it has acquired from some other place without restriction, that country can, as you say, get into the production of nuclear materials and into the production of weapons.

I would like to turn to the arrangement between the Federal Republic of Germany and Brazil, which you referred to earlier. The technology which is being made available to Brazil, both the enrichment technology and the reprocessing technology is under control. In other words, the agreement which Germany has entered into with Brazil, that is a public document which we can make available for the record, places control on the technology which Germany will supply.

WITHDRAWAL FROM NON-PROLIFERATION TREATY

Senator SYMINGTON. There is very little difference fundamentally between whether you sign the Non-Proliferation Treaty or whether you do not. Under the treaty, informally you can stop being a member tomorrow. Formally you can stop with a 90-day notice, can you not?

Mr. KRATZER. No, sir, the treaty has a provision, article X, which allows the right of withdrawal on '90 days' notice but under very, very limited circumstances.

Senator SYMINGTON. What do you mean by that?

Mr. KRATZER. I do not have the words at my fingertips.

Basically the treaty allows withdrawal on 90 days' notice only in the event of extraordinary circumstances not foreseen when the country became a part of the treaty.

DETAILS OF FRG ARRANGEMENT

Senator SYMINGTON. Do you have the details on the Federal Republic of Germany's arrangement?

Mr. KRATZER. Yes; I do.

Senator SYMINGTON. Would you file those for the record?

Mr. KRATZER. We have the complete text and will submit it for the record.

[As of the date of publication, the information referred to had not been supplied.]

EFFORT TO PUT REPROCESSING UNDER INTERNATIONAL SUPERVISION

Senator SYMINGTON. On the German-Brazilian deal, State testified the United States is trying to put the reprocessing under international supervision.

Has Brazil agreed to this?

Mr. KRATZER. No one has agreed to it.

Senator SYMINGTON. What effort is the United States making in seeing that Brazil comes under that?

Mr. KRATZER. The United States is fostering the concept—

Senator SYMINGTON. A concept?

Mr. KRATZER. Concept—that these reprocessing plants when they are built, and they will be built in several countries in years to come, be owned and operated on a multinational basis.

Senator SYMINGTON. Suppose the nation or country says we do not want to operate on that basis?

Mr. KRATZER. This is the difficulty.

Senator SYMINGTON. That is right. That is the reason we refused to make the deal with Brazil, but the Germans took it.

Is that not correct?

Mr. KRATZER. That is correct. We think the arrangements that Brazil and Germany entered into still leave opportunity for the plant to actually be constructed and operated under some sort of joint arrangements between the two countries.

BECHTEL CORPORATION'S PLANNED SALE TO BRAZIL

Senator SYMINGTON. In the current issue of "Science" magazine there is an article by Robert Gillette, who has written quite a bit on this matter, and disclosed that the Bechtel Corp. was involved in plans to sell the Brazilians a uranium enrichment plant.

Such efforts by Bechtel were carried on at the same time that Brazil and West Germany were finalizing their own arrangements.

I would ask the unanimous consent that the article in question be inserted at this point in the record. The article is entitled "Nuclear Exports: A U.S. Firm's Troublesome Flirtation with Brazil."

[The information referred to follows:]

[From Science magazine, July 25, 1975]

NUCLEAR EXPORTS: A U.S. FIRM'S TROUBLESOME FLIRTATION WITH BRAZIL

(By Robert Gillette)

The American failure to stop West Germany from selling sensitive nuclear technology to Brazil may have been inevitable even under the best of circumstances. For Washington to suggest that Bonn withdraw its unprecedented offer of uranium enrichment and plutonium processing technology to Brazil was, from the German point of view, a bit like General Motors asking Volkswagen to steer clear of South America. The predictable German response was that the Americans were suffering from sour grapes, and the deal was signed on 27 June.

The State Department's difficult task of convincing Bonn that the paramount U.S. concern was nuclear proliferation—not the protection of American commercial interests—was complicated, moreover, by an odd episode in Brazil last March involving an American corporation in the uranium enrichment business. The episode, repercussions of which continued into mid-April, seems to have resulted from poor communications between government and industry, as well as within the government, in the sensitive area of nuclear export policy.

The company in question is the Bechtel Power Corporation, a subsidiary of the huge Bechtel engineering and construction firm and a major builder of nuclear power plants. The parent firm is also one of about 20 U.S. companies to which the Energy Research and Development Administration (ERDA) has granted access to classified enrichment technology in the hope of bringing private enterprise into the enrichment business.

According to State Department sources, a sales representative of Bechtel Power held discussions last March with Brazilian government officials that left the clear impression the United States might allow construction of an enrichment plant in Brazil, one that Bechtel Power could build. In fact, the advisability of building enrichment plants in foreign countries—even without actually sharing classified details of the technology—is still under debate in the Ford Administration.

As it happened, Bechtel's gambit came just as Brazil and West Germany were moving into final negotiations on the sale of some \$5 billion to \$8 billion worth of nuclear reactors and fuel facilities—a deal that the Westinghouse Corporation had sought and lost. The timing of Bechtel's gambit, State Department officials say, lent itself to the interpretation that the U.S. government spoke with forked tongue—encouraging American industry in a last resort effort to recapture the Brazilian nuclear market with its own fuel facilities as “sweeteners” while, at the same time, urging Bonn to stop the sale of fuel technology in the interest of international security.

To make matters worse, German officials may have had an inkling of the Bechtel approach (though how accurate an inkling is hard to tell) weeks before such key elements of the State Department as the Arms Control and Disarmament Agency (ACDA) learned of it. Moreover, a four-man delegation the State Department sent to Bonn on 8 April to convey official American concern is said to have heard about the flap only after returning; the last of several clarifying cables sent to U.S. embassies in Bonn and Brasilia did not go out until 17 April.

Not surprisingly, some arms control officials were deeply angered at what appeared to be an American company's blunder into a foreign policy issue of extreme sensitivity. One official, still smoldering, described Bechtel's Brazilian maneuver as “totally unauthorized” and “way out of line.” Asked whether it contributed to German intransigence in the matter, he replied brusquely: “Draw your own conclusions.”

Another State Department official familiar with the affair said, however, that no one seriously regarded the Bechtel matter as “decisive” in influencing the Germans to conclude their deal with Brazil. Rather, he said, it played into German hands as a piece of “hard evidence” to support a predictable claim that U.S. criticism of the deal stemmed from commercial interests. By this view, the episode was more embarrassing than damaging.

PROGRESSIVE MISUNDERSTANDING?

The prevailing view among State Department officials familiar with the Bechtel episode is that it arose from a gradual misunderstanding of U.S. enrichment policy as that policy trickled down the corporate chain of command, ending with an overzealous salesman in Brazil. This explanation, however, is not entirely consistent with others.

The misunderstanding may have begun with a 28 January briefing ERDA held for companies with access to enrichment technology; the companies were told they could hold general discussions with potential foreign investment partners as long as they divulged no classified information. According to an official of the State Department's bureau of oceans, environment, and scientific affairs—the office formerly headed by Dixy Lee Ray—a Bechtel salesman “apparently got wind of this second- or third-hand, and seeing the nuclear deal slipping away to the Germans, pulled things out of context and essentially offered Brazil an enrichment plant.”

This official added that no restricted information was disclosed and that he believed Bechtel headquarters, in San Francisco, was “honest” in saying that it had no prior knowledge of the salesman's offer. “They probably would have had the political sensitivity to check with us before proceeding.”

THE VIEW FROM BECHTEL

This explanation, however, conflicts with that of a Bechtel corporation official in California who watched the controversy develop. The official, who asked not to be named, said the company's “offer” consisted of a proposal to study the feasibility of building a uranium enrichment plant in the northern Amazon basin, where enormous hydroelectric power potential exists far from Brazil's major industrial area of São Paulo. To avoid having to string transmission lines 2500 miles across the trackless Amazonian forest, Bechtel proposed to study the possibility of using the power on the spot in an enrichment plant and shipping the uranium fuel to nuclear power plants near the populous coastal cities.

"That's a little different from saying we're going to come in next week or next year and build a plant," the Bechtel man said, although he conceded that the proposal could have been interpreted as a first step in that direction.

He also dismissed as implausible the idea that one of the company's salesmen acted without the knowledge of the San Francisco headquarters. "These guys aren't selling used cars, you know. They're very, very cautious." In this case, he said, Bechtel headquarters was kept fully informed. He added that "I'm sure the State Department knew that what we were doing every step of the way. . . . My impression is that Dixy Lee Ray was kept apprised, totally."

Reached by telephone at her home on Fox Island in Puget Sound, Ray said her bureau had been generally aware of Bechtel's uranium enrichment activities but that she recalled nothing about the company's proposed feasibility study in Brazil. She added, however, that it didn't seem like the sort of thing a company would necessarily feel obliged to tell the government about.

Ray also had some harsh words for the basic approach to nuclear technology export policy taken by the arms control agency and by Secretary Kissinger's policy planning group, and she said this philosophical disagreement—which intensified with the debate over the West German-Brazilian deal—was one of the "last straws" that led to her resignation in June. Her position was that it ought to be possible for U.S. companies to build an enrichment plant in Brazil while preserving the secrecy of essential technology. She denied, however, encouraging Bechtel to propose such an arrangement. "They don't need to be told how to run their business."

Ray also contended that ACDA simply doesn't belong in the field of nuclear export policy. "They're meddling in areas where they don't belong, and they've made a real mess of things. They're trying to cover up their ineffectiveness in controlling conventional arms. It's conventional arms that are killing people, not nuclear exports."

Basically, the State Department has been trying quietly for the past year—ever since India's first nuclear explosion—to persuade other exporter nations to place more stringent conditions on the uses of all nuclear exports and to prevent the unilateral export of such sensitive technology as uranium enrichment and plutonium processing. In effect, the State Department seeks to establish a cartel-like arrangement, not to control price but to ensure the peaceful application of nuclear knowhow.

Some progress has been made. According to William O. Doub and Joseph M. Dukert, writing in the July issue of *Foreign Affairs*, the United States, the Soviet Union, and 8 other supplier nations filed letters with the International Atomic Energy Agency last August agreeing to tighten controls on nuclear exports to nations that are not parties to the Non-Proliferation Treaty (NPT). The suppliers agreed to require that receiving countries accept IAEA safeguards, provide assurances that fuel and equipment provided will not be used to make nuclear explosives, and agree not to re-export such items so as to evade the NPT. West German officials say that such assurances were obtained from Brazil. While the State Department considers this an "important step," arms control analysts still believe that enrichment and plutonium technology should under no circumstances be exported unilaterally, although they do favor multinational nuclear fuel centers under international control and serving an entire region such as South America. In the meantime, in the hope of setting an example, the State Department has discouraged companies from exporting fuel facilities and technology, whereas the United States' chief competitors in the world nuclear market, West Germany and France, have not.

Ray, like many in the nuclear industry, regards this policy as "simplistic" and self-defeating. "They're trying to bottle up nuclear technology and make every new nuclear program out to be the beginning of a military operation." The United States has turned aside entreaties, for example, from Zaire, which is looking for enrichment technology. As for Brazil, Ray noted that last summer, when she was still chairman of the Atomic Energy Commission, the AEC had received clear indications that Brazil was looking for a supplier of enrichment technology and was growing impatient with U.S. reluctance to provide it. Far from preventing the West German deal, Ray said, "we drove the Brazilians into it. I blame ACDA."

NECESSARY SACRIFICE

State Department officials say her point of view is legitimate but short-sighted. "We may have to sacrifice a sale or two along the way," one official said. "But what we're trying to do is create a climate of responsibility." Another official

compared the nuclear export problem to that of the conventional arms trade: "You get the same arguments, but there the industry has largely prevailed. And there are essentially no controls."

The practical effect of this debate last spring seems to have been poor communication within Ray's bureau and arms control officials concerned with the impending West German-Brazilian deal. As Ray puts it, "They knew my position and they made every effort to keep me and my bureau out of it."

Perhaps the fairest assessment would be to say that it pointed up poor coordination within government, and between government and industry, in a critical area of foreign policy. Seemingly with this in mind, Fred C. Iklé, the director of ACDA and still a dominant voice in the setting of nuclear export policy, has spoken recently with officials of U.S. supplier companies and with ERDA administrator Robert C. Seamans, Jr., in an effort to clarify the government's position and improve communications. "More will be done," Iklé said in a brief interview. "U.S. companies are entitled to be kept fully informed of the constraints on nuclear technology exports."

BECHTEL CORPORATION OPERATIONS

Senator SYMINGTON. Did you know that Bechtel was operating on the side without discussing the matter?

Mr. KRATZER. We learned shortly after that contact had taken place that a letter had been sent from Bechtel to Brazilian authorities.

Senator SYMINGTON. Did they send you a copy of that letter?

Mr. KRATZER. No, sir, but we have subsequently received it.

Senator SYMINGTON. By your request?

Mr. KRATZER. No. I believe it came through embassy channels.

Senator SYMINGTON. After Germany had made the deal?

Mr. KRATZER. Yes. This was at a very advanced stage of the Brazilian-Germany discussions. My personal view is it had no bearing on it. It came much later.

Senator SYMINGTON. Let me ask a question on these matters. Why would Westinghouse be working with the State Department unsuccessfully—and I hope in the future they will be more successful if it means jobs; we need jobs over here—at the same time that the Bechtel Corp. would be working directly with Brazil without even being in touch with the State Department?

Mr. KRATZER. I think this was a result—in other words, the Bechtel correspondence with the Government of Brazil—was a misunderstanding on the part of Bechtel. I am certain it was an honest misunderstanding as to U.S. Government policy.

Senator SYMINGTON. Do you know a Mr. George Schultz with the Bechtel Corp.?

Mr. KRATZER. No, I do not.

Senator SYMINGTON. Do you know if he had any interest in this matter at all?

Mr. KRATZER. I do not know.

Senator SYMINGTON. Could we have any correspondence that you have filed in the record with the Bechtel Corp. about this operation?

Mr. KRATZER. Yes, sir.

Senator SYMINGTON. Cables. letters.

Mr. KRATZER. I will make available everything we have, sir.

[As of the date of publication, the information referred to had not been supplied.]

Senator SYMINGTON. What is our policy concerning the transfer of uranium enrichment facilities to foreign countries? Again I ask, how could Bechtel be carrying out such efforts at the same time that

the State Department was presumably discouraging Bonn from selling uranium enrichment facilities to Brazil?

Mr. KRATZER. This is an area where I indicated that I thought there was an honest misunderstanding on the part of Bechtel as to U.S. policy. The United States has indicated that under certain circumstances in the future it could be prepared to cooperate in the transfer of uranium enrichment technology abroad.

Senator SYMINGTON. As I understand it, Westinghouse asked if they could do it. You said no. Bechtel did not ask and went ahead and did it.

Mr. KRATZER. Bechtel was exposed to a number of conversations with the U.S. Government in its role as a sponsor of the uranium enrichment plant which is to be built here in the United States.

PRIVATE CAPITAL AND GOVERNMENT GUARANTEES

Senator SYMINGTON. You say built in the United States. To be built by private capital?

Mr. KRATZER. Built by private capital, yes, sir.

Senator SYMINGTON. Any Government guarantee on that?

Mr. KRATZER. There will be.

Senator SYMINGTON. Why do you call it private capital?

Mr. KRATZER. The capital is private. There will be Government guarantees.

Senator SYMINGTON. It is not private if it is Government guaranteed. If I start a supermarket out here or a drugstore, I do not get any Government guarantee. If I did get a Government guarantee, I would not have the guts to call it private capital.

Would you, to be frank?

Mr. KRATZER. None of my capital is guaranteed, sir.

Senator SYMINGTON. Just because you are big does not mean that when you get a large Government guarantee you are still using private capital, does it?

I am just asking. It appears to be sort of a mystery.

Mr. KRATZER. I would say that this is a facility which has both private and governmental aspects. The funds will come from private sources.

Senator SYMINGTON. If it is a failure, then the Government puts the money up.

Mr. KRATZER. Yes, sir.

Senator SYMINGTON. The workingman or the unemployed man, if he pays any taxes, he pays for the mistake.

Is that right?

Mr. KRATZER. We do not expect a failure to occur. I am not an expert on this arrangement. Perhaps I should ask others to testify.

Senator SYMINGTON. I am not being critical. I remember one time in another country where we put \$90 million into a corporation some years ago. I finally got the fellow to admit that it was problematic whether it would succeed. He said, really, after all it is not too much of a load on us because the Government is guaranteeing 90 percent.

That involved \$90 million. In those days \$90 million was quite a bit of money.

I am just wondering why we talk about private enterprise getting into the picture if there is a Government guarantee. I can see why you

might want to make a deal whereby you had a management deal and you had a fee based on the amount of money involved. This business of going around and talking about private enterprise when you have a Government guarantee behind it is just a little ridiculous, wouldn't you think so, quite frankly?

Mr. KRATZER. Mr. Chairman, my knowledge of the details of this arrangement is just not sufficient for me to be an authoritative witness. If others here—

U.S. GOVERNMENT GUARANTEES OF PRIVATE URANIUM ENRICHMENT VENTURES

Senator SYMINGTON. You did say there was a Government guarantee.

Mr. KRATZER. There are Government guarantees. I do not know whether they extend to the equity capital. I do not know whether they cover the entirety.

Senator SYMINGTON. Who does know? Do you know, Mr. Friedman?

Mr. FRIEDMAN. I could get that information for you.

Senator SYMINGTON. Does not anybody here know, does not anybody know the nature of the Government guarantee?

Mr. FRIEDMAN. I am the ERDA representative; here primarily to address the international export program. I am sure we can very readily get that information.

Senator SYMINGTON. Would you and Mr. Kratzer and Mr. Vest get together and give us a statement that both agencies agree on that has to do with the nature, degree, the amounts, et cetera, of the Government guarantee of any private enterprise investment in uranium enrichment.

[The information referred to follows:]

U.S. GOVERNMENT GUARANTEES AND ASSURANCES RELATING TO PRIVATE URANIUM ENRICHMENT VENTURE

[Supplied by Department of State]

With respect to the Government guarantees and assurances relating to private uranium enrichment ventures, the Fact Sheet issued together with the President's message to Congress of June 26, 1975, on uranium enrichment contains the following language dealing with cooperative arrangements with private firms:

"These arrangements would provide for certain forms of Government cooperation and temporary assurances found to be necessary after detailed negotiations with firms submitting proposals. Arrangements could include:

Supplying and warranting Government-owned inventions and discoveries in enrichment technology—for which the Government will be paid.

Selling certain materials and supplies on a full cost recovery basis which are available only from the Federal Government.

Buying enriching services from private producers or selling enriching services to producers from the Government stockpile to accommodate plant start-up and loading problems.

Assuring the delivery of uranium enrichment services to customers which have placed orders with private enrichment firms.

Assuming the assets and liabilities (including debt) of a private uranium enrichment project if the venture threatened to fail—at the call of the private venture or the Government, and with compensation to domestic investors in the private ventures ranging from full reimbursement to total loss of equity interest, depending upon the circumstances leading to the threat of failure.

The arrangements would be spelled out in a detailed contract, and the basis for arrangements would be subject to Congressional review.

It is intended that any undertaking by the Government to acquire assets or interest and to assume liabilities of a private venture would end after approximately one full year of commercial operation of a plant. The precise period would be determined in the negotiation of definitive agreements.

The Government would monitor progress carefully so that it can be sure that the plant will function properly and will be completed on time and within cost estimates.

Assurances for customers.—The President announced his pledge to domestic and foreign customers who place orders with private U.S. suppliers that the Government will assure that orders will be filled as services are needed. Those first in line with private suppliers will be first in line to receive services from the Government—if it were necessary for the Government to take over and complete a private project.”

Mr. Kratzer's answers to certain questions raised by Senator Symington at the hearings on *U.S. Policy with regard to transfer of Nuclear Equipment, Technology and Material* which took place on July 22, 1975 before the Senate Subcommittee on Arms Control, International Organization and Security Agreements of the Committee on Foreign Relations.

Question 1. Would (Mr. Friedman from ERDA) and Mr. Kratzer and Mr. Vest get together and give us a statement that both agencies agree on that has to do with the nature and degree, the amounts, etc., of the government guarantee of any private enterprise, investment in uranium because it begins to look to me as if we were caught short in our estimate of the amount of enriched uranium we would need in this country.

Answer. Since mid-1974, when the AEC was no longer able to continue entering into enrichment services contracts because its available capacity was fully committed, our nuclear trade relations with other countries have suffered under the continuing uncertainty over whether, when and how new U.S. enrichment capacity would be constructed.

The President, in June 1975, decided that future expansion of U.S. enrichment capacity should be undertaken by private industry. To accomplish this end, the Nuclear Fuel Assurance Act (NFAA) was proposed for legislative action. The NFAA provides for the establishment of private enrichment capacity utilizing both the gaseous diffusion and centrifuge processes. In bringing this capacity into being, the proposed legislation calls for certain Governmental back-up guarantees and assurances, as will be subsequently discussed. The first plant which is expected to be built under the provisions of the NFAA is that of the Uranium Enrichment Associates (UEA), utilizing the gaseous diffusion process.

With respect to the Government support and extent of private industry-risk taking under the UEA arrangement, several facts are relevant, keeping uppermost in mind the fact that negotiation of the UEA proposal is currently in progress, with a major objective being to minimize the extent of governmental guarantees:

The risks are major in terms not only of financing, but also of manpower resources and corporate commitments, since multi-billion dollar investments are involved, the success of which is dependent on classified technology developed by the U.S. Government which has not been proven in a commercial setting. Without exception, potential entrants in the enriching industry, as well as representatives of the U.S. financial community, have viewed this activity as presenting abnormal business risk—according to their testimony before the JCAE in 1974 hearings.

Government assurances would be valid only for a relatively short transition period, terminating automatically. Thereafter, the enrichment plant owner would fully assume all business risks and commitments for the remainder of expected plant operating lifetime.

The possibility of guaranteeing return on equity is under current negotiation as a part of overall risk assessment. A substantial risk does exist under the presently proposed arrangements for at least partial loss of private equity.

It is anticipated that Government funds involved in backing up the guarantees would ultimately be recovered, normally from the private project but, in any case, from sale of enrichment services.

If, as an alternative, the Federal Government were to finance, construct and own additional enrichment capacity it would bear, in contrast to private ownership, the major risks for the entire life of the plant.

U.S. NEED OF ENRICHED URANIUM

Senator SYMINGTON. It begins to look to me as if we were caught short in our estimate of the amount of enriched uranium we would need in this country.

Is that correct?

Mr. KRATZER. We have run out of capacity. We saw that coming but we did not take action.

Senator SYMINGTON. One Government official told me it was going to cost \$600 billion to handle the energy problem. That is a lot of money.

I am wondering how much of that will be called private enterprise but guaranteed by the Government. That was quite a prominent person in the energy field who said that.

Mr. KRATZER. In the decades to come the capital requirements are very large.

LACK OF IAEA PRESENCE AT EIGHT-COUNTRY LONDON MEETING

Senator SYMINGTON. It has been reported in the press that the major nuclear supplier countries have held a number of meetings to discuss ways in which the rapid spread of nuclear material can be brought under more stringent control. During our recent visit to the Vienna-based IAEA, we learned that this agency which has responsibility for overseeing international safeguards was not present at that meeting, nor being kept informed as to its progress. There were eight countries, including the United States, that were meeting in secret in London, as I remember.

Mr. VEST. Yes, sir; there was a meeting in London, as reported in the press. There were a certain number of countries. The talks are still exploratory.

If you want to pursue this particular matter. I would appreciate it, sir, if we could do that in executive session. I would be glad to do it.

Senator SYMINGTON. One of those countries was Germany, was it not?

Mr. VEST. Yes, sir.

Senator SYMINGTON. No representative of the supervisory agency, the IAEA, was present. Is that correct?

Mr. VEST. At this point we had a certain number of representatives of a limited group of countries trying to explore the subject. They did not feel that they had reached the stage where they had a sufficient harmony of viewpoint to bring in other entities or other persons.

Senator SYMINGTON. The eight countries were listed in the press. Would you care to list them now or should that be in an executive session?

Mr. VEST. If I am going to go on, sir, I owe it to the other members who are taking part in these confidential conversations to have it in executive session.

Senator SYMINGTON. You would not deny that the eight countries mentioned all over Europe were the ones that met in London?

Mr. VEST. Sir, since I happen to read in the omniscient press reference to a number of countries which varied from time to time, de-

pending on the stories, I would rather not say. There were different countries cited in different newspapers.

Senator SYMINGTON. There were different countries?

Mr. VEST. Yes, sir.

Senator SYMINGTON. That is funny. In the various papers I saw abroad all the countries were the same, in Switzerland and Austria and in France.

Mr. VEST. In the accounts printed in this country, the countries varied.

Senator SYMINGTON. In this country they varied.

Mr. VEST. Yes, sir.

Senator SYMINGTON. Well, sir—

Mr. VEST. I have no objection to pursuing that but in executive session.

Senator SYMINGTON. If you have no objection to doing it in executive session, would you tell us now why you do not want to tell it in open session?

Mr. VEST. Yes, sir.

The countries involved in these talks prefer to have this activity confidential as long as we were going along in this exploratory phase. While we were prepared to be open, they specially asked the matter be kept confidential for the time being.

Senator SYMINGTON. Everybody knew it was in London.

Mr. VEST. That is right, sir.

Senator SYMINGTON. Some of the countries that are in the nuclear club were there; some of the countries that are in the nuclear club were not there, correct?

Mr. VEST. Yes, sir.

Senator SYMINGTON. You do not want to tell us which ones?

Mr. VEST. No, sir. You are quite right.

They asked us to respect the confidentiality of their participation. I feel that I have to.

Senator SYMINGTON. If they asked us to respect it over here and we do, I wish that they would ask their people over there in their countries to respect it, which they do not.

BECHTEL AND U.S. POLICY

If I asked this question before, forgive me. What is our policy concerning the transfer of uranium enrichment facilities to foreign countries and how could Bechtel be carrying out such efforts at the same time that the State Department was presumably discouraging Bonn from selling enrichment facilities to Brazil?

Mr. KRATZER. Yes, sir, I began to respond to that question. I would like to complete my response.

We have indicated under certain conditions and at certain times in the future we would be prepared to exchange or transfer uranium enrichment technology to other countries. We have not spelled out the exact conditions under which that might take place. In effect, we have indicated a willingness to listen to proposals, to evaluate them on the

basis of many criteria, including the existence of very, very strong and effective safeguards against proliferation.

I am sure that it is as a result of hearing of that policy and failing in good faith to appreciate its limitations, its nuances, that there are proposals that have to be considered very carefully in relation to such criteria as nonproliferation that Bechtel did explore with Brazil and did say to Brazil that there is a possibility, I do not know the exact words they used, that they might be able to put a uranium enrichment plant in Brazil. All of the details of our policy were lacking in that communication and it led to the impression on the part of Brazil, that something along those lines could take place quickly and that is not the case.

IAEA'S NONATTENDANCE AT LONDON MEETING

Senator SYMINGTON. I want to get back to this and then we can leave it. We know that eight countries met in London in a secret meeting. We also know that the Atoms for Peace plan was set up some 20 years ago or thereabouts as an effort to help the world; and now it looks as though the Atoms for Peace plan could be an Atoms for War plan, the worst type of war, nuclear war. It is becoming increasingly easy to get both plutonium and enriched uranium. You only have to enrich it from 0.723 percent and then you can use the plutonium you create while making electrical energy.

Why was it that the IAEA, the international monitor of this whole how, was not allowed to come to the secret meeting in London?

Mr. VEST. Sir, you keep referring to eight countries. I do not know what the press in Europe is saying. It is worth mentioning that most of the stories in this country refer to seven.

Senator SYMINGTON. It is not such a terrible mistake.

Mr. VEST. I did not want you to think that I was leading you on.

Senator SYMINGTON. Maybe somebody walked out.

Mr. VEST. The countries themselves have gone into these conversations very tentatively exploring the subject. When they have had enough conversation, when they feel they have some harmony of viewpoint, they will then address what they will do in relation to agencies in other countries.

COORDINATION OF ERDA NUCLEAR EXPORT LICENSING

Senator SYMINGTON. I will not pursue it.

Mr. Friedman, it is our understanding that the Energy Research and Development Administration, ERDA, is responsible for the promotional and development side of what used to be the Atomic Energy Commission.

Mr. FRIEDMAN. Yes, sir.

Senator SYMINGTON. How does ERDA coordinate its nuclear export licensing with the Department of State? Did ERDA send anybody to West Germany and/or Brazil during the course of the German/Brazilian negotiations that discussed those negotiations?

STATEMENT OF ABRAHAM S. FRIEDMAN, DIRECTOR, DIVISION OF
INTERNATIONAL PROGRAMS, ENERGY RESEARCH AND DEVELOP-
MENT ADMINISTRATION

Mr. FRIEDMAN. Let me discuss the first one first with your permission. ERDA has the responsibility with the Department of State and we work closely with the Department of State, in developing agreements for cooperation with other countries under which—

Senator SYMINGTON. Did you send anyone to West Germany or Brazil?

Mr. FRIEDMAN. Do you want the second part first?

Yes, we did. A member of the interagency team that went to West Germany was from ERDA. That is correct.

Senator SYMINGTON. When they went to West Germany did they urge that the uranium enrichment process technology not be given to Brazil?

Mr. FRIEDMAN. They supported the U.S. position there which I think addressed two subjects. One, the concern that this Government has regarding the making available enrichment technology, enrichment plants and reprocessing plants under other than carefully developed conditions.

The other purpose was to determine that whatever was being done was done under the most stringent safeguards that we could induce the Germans to apply.

I think that in the latter respect, the group that went to West Germany was successful.

EXTENT OF BRAZILIAN URANIUM DEPOSITS

Senator SYMINGTON. Of course, as you know, Brazil has a great deal of uranium deposits, some newly discovered.

Is that not right?

Mr. FRIEDMAN. Actually, they do not have that much. With your permission I can read into the record some figures which we obtained. They have great expectations.

Senator SYMINGTON. If you would supply for the record what you know they do have. It was only recently that they said they found some new uranium deposits.

[The information referred to follows:]

BRAZILIAN URANIUM RESOURCES

[SUPPLIED BY DEPARTMENT OF STATE]

At extraction costs up to \$15/lb U308, Brazilian reasonably assured reserves total about 4,000-6,000 tons U308 and estimated additional resources total about 10,400 tons. By contrast, within the same cost range, United States reasonably assured reserves alone total about 420,000 tons.

POSSIBILITY OF BRAZIL'S BECOMING NUCLEAR POWER

Senator SYMINGTON. If they do have them and if we give them not only the technology incident to the creation of plutonium as a result of electrical energy generated but also give them the uranium enrichment process, than they can decide, the dickens with everybody and put a fence around their country, and could in due course become a nuclear power; could they not?

Mr. FRIEDMAN. Of course. This is why this Government is extremely concerned about making available—as the Chairman knows, there are two ways you can make a nuclear weapon; you can use plutonium and you can use highly enriched uranium—our position is that we need to be extremely careful about making available reprocessing plants which are the way you get the plutonium.

Senator SYMINGTON. I understand that. Dr. Agnew pointed out to me the other day that you would never have to go to enriched uranium to the point of making bombs. All you have to do is to take the plutonium incident to making the electricity that they are so badly in need of in Brazil.

GERMAN REPRESENTATIVE SENT TO GERMANY

In any case, as I understand it, you did send somebody there. You urged them not to make the deal. Is that correct?

Mr. FRIEDMAN. Yes. As I say, there were two aspects of it. One was to express our very serious concern about that aspect of the deal, that is the provision of the enrichment technology, the provision of reprocessing technology.

The other aspect of the visit was to impress on the Germans our concern that only the most stringent safeguards be applied. As I say, they were successful in the latter.

Senator SYMINGTON. As long as the Brazilians agreed to do it. We understand the United States presently has agreements in force for cooperation in nuclear matters with some 30 nations. Is that correct?

Mr. FRIEDMAN. Yes.

UNITED STATES REVIEW OF POSSIBLE REACTOR SALES

Senator SYMINGTON. When the United States reviews a possible reactor sale, is the potential, possible interest in developing nuclear weapons weighed?

Mr. KRATZER. Yes, sir; very much so.

Senator SYMINGTON. If so, is evidence of the desire to have nuclear weapons a reason to refuse the sale?

Mr. KRATZER. I think we will weigh that into our final decision. I can imagine circumstances where some indication of the country's interest in moving in that direction would not be considered reason not to go ahead. We might very well want to have the positive advantage of involvement in the nuclear programs, under safeguards to help influence it away from that objective.

Senator SYMINGTON. Has the United States ever refused to sell nuclear reactors because of an evident interest in nuclear weapons?

Mr. KRATZER. I know of no case of that nature, Mr. Chairman.

Senator SYMINGTON. Do you know of any?

Mr. FRIEDMAN. I think there is a case where we discouraged the sale of a research reactor to a country which had, whether for press purposes or not, talked about developing them.

CAN WEAPONS POTENTIAL COME FROM RESEARCH REACTOR?

Senator SYMINGTON. You could not make atomic weapons out of plutonium from a research reactor.

Mr. FRIEDMAN. The only nuclear weapons—I will not call them

nuclear weapons—the only nuclear explosive device that has been developed since the five nuclear weapons countries went nuclear was the nuclear explosive device made by India based on a research reactor Senator SYMINGTON. That had to do with Canada. I was not talking about that.

Mr. FRIEDMAN. The point is yes. A large enough research reactor using natural uranium and the capacity to reprocess the spent fuel from that research reactor could give a country a weapons potential.

Senator SYMINGTON. The Scientific Director of Brazil's Center of Physical Research was quoted as saying, "Brazil already has the necessary conditions for building its first atomic bomb." That was nearly a year before the German arrangement with Brazil.

I would ask unanimous consent that the article in the Times be printed in the record at this point.

[The information referred to follows:]

[From the New York Times, Aug. 24, 1974]

BRAZILIAN A-BOMB REPORTED WITHIN COUNTRY'S CAPACITY

RIO DE JANEIRO, Aug. 23.—The scientific director of Brazil's Center of Physical Research, Alfredo Marques, said yesterday that "Brazil already has the necessary conditions for building its first atomic bomb."

But Mr. Marques, speaking at an astronomy seminar, said there were other problems to be solved in making the bomb, because "a project of this nature involves rather ample questions, including the diplomatic field."

Brazil presently depends on the United States for plutonium and enriched uranium. The supplies are covered by an agreement signed with the U.S. Government 2 years ago, providing radioactive materials for Brazilian nuclear power plants for 30 years.

NUCLEAR WEAPONS DEVELOPMENT: INTENTION AND PREVENTION

Senator SYMINGTON. Mr. Vest, do you believe that any of the nations that we have made arrangements with intend to develop nuclear weapons?

Mr. VEST. You are referring to the conversations we have been having in London, sir.

Senator SYMINGTON. No, I just asked the question, do you believe that any of these nations that we are talking about—we have some 30 nations that we are cooperating with in nuclear matters—whether they intend to develop nuclear weapons?

Mr. VEST. No, sir. I would add to Mr. Kratzer's comment. If we felt that any country was intending to develop nuclear weapons, I think there would be very serious reevaluation of our policy activities with that nation.

Senator SYMINGTON. Is there anything that we could do to prevent it if they decided to do it, besides landing the Marines, and that would seem to be unlikely?

Mr. VEST. Your alternatives range over the whole realm of relationships that you have with that country and how many of them you want to apply—political, economic, and other relationships.

Senator SYMINGTON. Do you think if we found a country that had not signed the Non-Proliferation Treaty and decided to make weapons, that we would apply sanctions against that country?

Mr. VEST. I would not like to reply in the abstract, sir, in a hypothetical case.

EUROPEAN TURN TOWARD SOVIET ENRICHED URANIUM

Senator SYMINGTON. An article in the July 6, New York Times is entitled "Europeans Turning to Soviet Uranium." It says the European Economic Community, which traditionally has purchased enriched uranium almost exclusively from the United States, is turning increasingly toward the Soviet Union, that this is happening because the world demand for enriched uranium has strained the American production capacity to the limit, and that the Russians are apparently willing to sell their nuclear fuel at lower prices and with fewer transport problems.

What is your understanding of this situation?

Mr. FRIEDMAN. I think that that is the case, that the Soviet Union has been prepared on a limited scale to contract for the sale of enriching services. They have used as a pricing basis whatever our price is, less about 5 percent.

The days of the past where the United States was the unique supplier of enriching services to power reactors throughout the world are gone.

Senator SYMINGTON. Last April the United States Nuclear Regulatory Commission stopped issuing export licenses for all nuclear materials while completing a full review of transport safeguards.

Did this action raise concern in the minds of the Europeans as to the reliability of the United States as a nuclear fuel supplier?

Mr. KRATZER. Yes, sir, I think it did. This was the result largely of a misunderstanding as a result of press reports which indicated that the Nuclear Regulatory Commission had imposed a moratorium on shipments.

As a matter of fact, there was no such moratorium. They changed their procedures to provide for higher level review, review by the NRC Commissioners themselves. This did result in delays and slowdowns. We are working these out and the material is beginning to move again.

GOVERNMENT-GUARANTEED PRIVATE INDUSTRY PRODUCTION AND SALES

Senator SYMINGTON. President Ford recently announced a plan to allow American private industry to produce and sell enriched uranium, presumably with a Government guarantee.

Is that right?

Mr. KRATZER. The arrangement I referred to earlier.

Senator SYMINGTON. That is the one Bechtel made, that they get the Government guarantee.

Mr. KRATZER. There are Government guarantees.

Senator SYMINGTON. What implications does this plan have for the future ability of the United States to provide enriched uranium on the world market and what restrictions, if any, are being contemplated to prevent the increased sale of enriched uranium from being used for weapons development in the present nonnuclear states?

Mr. KRATZER. First of all, I would like to comment on the first part of that question.

It is extremely important for all the reasons that we have brought out today that we be in a position once again to restore our role and our credibility as an enriched uranium supplier. The President's proposals will put us in a position to do that.

I think in the absence of an expansion of our uranium enrichment capacity we will lose a great deal of our ability to advocate and bring about improved nonproliferation policies in the rest of the world. The enriched uranium from that project will be distributed under the same tight controls and safeguards that we have applied to uranium enriched in Government facilities in the past. It will result in no change at all in the effectiveness of our control arrangements.

Senator SYMINGTON. Senator Humphrey.

DIXON-YEATS CONTROVERSY

Senator HUMPHREY. To bring us up to date, we had quite a battle around here in the Congress some time ago over the Dixon-Yeats contract.

Do you remember that?

Mr. KRATZER. Yes, sir. I was in the Government at that time.

Senator HUMPHREY. There was a fellow by the name of Wentzel who was vice president of the First Boston. He was involved in what we call conflict of interest. So that contract was stopped. I was involved in the fight on that in the Congress. There were certain enrichment plants, I think three of them, that were Government owned. When Mr. Nixon came into office he said he wanted to sell those plants to the private sector.

Am I correct?

Mr. KRATZER. The enrichment plants. The Government owns three of them at the present time. I believe the debate you referred to, the Dixon-Yeats controversy, had to do, as I recall it, with the supply of electric power to the Government enrichment plants.

Senator HUMPHREY. That is correct. It was a Government guarantee behind it.

Mr. KRATZER. At a later date—I do not want to pose as an expert on this, sir. Over the years I have been involved in this business, there have been several proposals to bring private enterprise into the uranium enrichment process, including at times the sale of the existing facilities. I cannot attach dates to those proposals. They have come up from time to time over the years.

GOVERNMENT FORMULA OFFERED BECHTEL CORP.

Senator HUMPHREY. I have a note here from someone rather knowledgeable in this area. He served for years on the Joint Atomic Energy Committee.

It says: Eleven corporate groups were given access to enrichment technology on the basis of giving them an opportunity to build a plant at their own capital risk. They decided they could not do it, except Bechtel. But the Federal Government did not offer the others the no-risk formula now being offered to Bechtel-Goodyear.

Is it not true that Bechtel-Goodyear plant has 60 percent Iranian and Japanese equity capital?

Mr. KRATZER. I can handle the last part of that question. There are proposals that 60 percent of the capital for UEA, the Uranium Enrichment Associates plant, come from private sources. I am sorry. I misspoke myself—from foreign sources.

This, of course, is subject to a great deal of future negotiation. At the moment, there are no firm agreements for that to take place. There have been enough discussions on the part of the Bechtel people to lead to some reason to believe that they can raise a substantial part of the capital from abroad.

Senator HUMPHREY. The Bechtel people have been assured that if things do not go well with this costly operation, the Government will bail them out.

Is that not a fact?

Mr. FRIEDMAN. It is a fact that there are certain Government assurances and guarantees, as I told Chairman Symington earlier. I do not have these immediately available. Of course we will bring this to the attention of the committee.

[As of the date of publication, the information referred to had not been supplied.]

Senator HUMPHREY. Is it not a fact that if this is a private proposition entirely the cost of the enrichment could go up considerably?

Mr. FRIEDMAN. It is obvious if it is private it is going to be profit-making. At least it will attempt to be.

Senator HUMPHREY. The American taxpayer paid for all the research; did he not?

Mr. FRIEDMAN. Yes; it is my understanding that part of the arrangement which is being negotiated with the private interests involves the payment of a royalty to cover the investment.

Senator HUMPHREY. That would be quite a payment. I would be interested in that formula. I am an old hand at this. I spent some 33 days on the last fight, I think in the late 1950's, when we went around on Dixon-Yeats? Also, when they were going to turn over the plans from the Atomic Energy Commission to the private sector, after the taxpayer had paid for all of them.

This is an old fight and I will not bother you about it, except, as I understand it, this Bechtel formula will insure that atomic fuel rods will be raised to approximately the British thermal unit cost level of oil, coal, and gas, because you are going to have some of the same companies in this business. Today those atomic fuel rods are about one-seventh of the cost in terms of energy of the British thermal unit cost of oil, coal, and gas. I know this gets away from nuclear proliferation. I am interested from the economic point of view. The minute I see this stuff creeping over to these multinationals, such as the Bechtel-Good-year proposition in which there is a possibility of 60 percent Iranian and Japanese financing, it becomes no longer an America enterprise.

LOSS OF CONTROL AT MULTINATIONAL LEVEL SUGGESTED

By the way, Mr. Chairman, as you know, we have taken great pains here on siting, for example, of these enrichment plants, to make sure the enrichment was sort of low enrichment, to do many things to prevent the export of the enrichment process.

Once you get into a multinational level with this Bechtel operation, you lose control.

Is that not a fact?

Mr. FRIEDMAN. As the Senator noted, this is not my area of expertise.

Senator HUMPHREY. Nor mine. I just got a sniff of it and I will tell you my hair started standing up on end. I went through this once before. It reminds me of the Great Depression when I see high interest rates and high unemployment. I get the shivers.

Mr. FRIEDMAN. I did want to point out that the Atomic Energy Act requires that control of an enrichment plant be in the hands of U.S. persons. Therefore, any participation by foreign investors will have to be based on a formula which gives complete control of the plant to the U.S. investor.

Senator SYMINGTON. If the gentleman would yield, that does not add up. Even if the country has signed the Non-Proliferation Treaty, it can get out of that treaty if it wants to. For instance, take the case of Brazil, which originally aroused our interest. After we lost the jobs and we lost the business, a country for which we spent a couple hundred billion dollars to preserve its security since World War II got the business, got the jobs, got the profits out of the jobs. That nation made its deal with a country that has not signed the Non-Proliferation Treaty. All Brazil has to do is say: Now we have the knowledge. Thank you very much. Goodby.

Mr. FRIEDMAN. That is precisely why this plant is being built in the United States, not being built outside of the United States.

Furthermore, the participation by foreign investors will not involve and we will not permit the transfer of the classified technology which makes the plant run.

Senator HUMPHREY. I think that is highly dubious. Once you have 60 percent foreign equity capital, it may be an American company, but the technology soon becomes fully understandable. If you have Iranian and Japanese capital to the tune of 60 percent, that is controlled. Money controls.

I cannot believe in an area like this that we are going to permit 60 percent foreign capital. My information is that that is pretty well sewed up now.

Mr. KRATZER. Senator, I do not think it is sewed up. As I indicated earlier there are indications that up to 60 percent of the capital can be raised abroad. It would not be from just the two countries that you mentioned. That is an important distinction.

In other words, no country would be allowed to acquire more than 20 percent. Several countries in addition to the two you mentioned have expressed an interest.

Senator HUMPHREY. I understand the Joint Committee on Atomic Energy is going to be looking at this. I am going to be looking into it on the basis of the cost items in reference to fuel, because what we are really going to do here is not only exporting our technology but exporting kilowatts because this enrichment program is vital to our own economy.

We have a power shortage around this country. There is always an argument on the safety of the nuclear plants. If there is a short supply of enriched uranium, it permits the Soviet Union to come in and fill the market in Europe. By your own testimony we are having difficulty meeting the demands.

If we start a process where we export this at the private corporate level with higher costs, we are not only going to be calling upon our own people to pay higher costs, but we are going to be exporting needed kilowatt-hours from our own country.

Mr. KRATZER. One of the reasons for the interest in foreign investment in this facility is that the demand in the U.S. market is not strong enough for construction of a full-size diffusion plant to meet U.S. requirements alone. If it were, I think I could say with a great deal of assurance that a plant would be built without foreign investment.

WHY BECHTEL GOT GUARANTEES

Senator HUMPHREY. Why did 11 countries that were offered an opportunity to get in not go in? Why was it that Bechtel, which has former Secretary of the Treasury Shultz as one of its principal officers, get the protection formula, the guarantee?

That intrigued me.

Mr. FRIEDMAN. It is my understanding that several of these companies that are interested in the centrifuge process do intend to submit proposals to the U.S. Government, to ERDA in the near future.

Senator HUMPHREY. Did they not first of all turn it down because they said they could not make it a profitmaking proposition?

Mr. FRIEDMAN. They did not pursue it.

Senator HUMPHREY. Let us talk frankly man to man. They did not pursue it. I say they turned it down. They had the opportunity. They did not get the Government guarantees, did they?

Mr. FRIEDMAN. It never got that far.

Senator HUMPHREY. It did not get that far. How did it get that far with Bechtel?

Mr. FRIEDMAN. I do not know.

Senator HUMPHREY. Would you like to take a guess at it?

Mr. FRIEDMAN. I would prefer not to.

Senator SYMINGTON. You prefer not to.

QUESTION OF SELLING FUEL CYCLE PROCESS

Senator HUMPHREY. We will come back to that. I want to commend the chairman on pursuing this. What is most important here is the question of the fuel cycle process, selling all of the elements of the complete fuel cycle to another country, which West Germany has done.

I have one question I want to ask and then I will yield because the chairman has the knowledge in this area.

Do you know of any circumstances under which the United States would sell the elements of the complete fuel cycle to any other nation? If not, why not? If so, under what circumstances?

Mr. FRIEDMAN. This is a question which is a policy matter that the State Department would address before turning it over to them.

I think that one approach might be—this is one which has been discussed within the administration—if there were international participation, regional location, demonstration of the economic and technical need for such facilities, I think that a situation could be considered where it would be prudent and reasonable to do that.

If your question is do I think that it would be prudent and reasonable to make available, without that kind of careful analysis, enrichment facilities or reprocessing facilities, to countries without demonstrating these requirements, my own view is it would not be prudent and we should not do it.

Senator HUMPHREY. Has the Soviet Union ever sold all the elements of a complete fuel cycle?

Mr. FRIEDMAN. I doubt it. That would not make me feel comfortable if they did. They somehow have more control over people they sell things to than we do because they sell within the Soviet bloc.

Senator HUMPHREY. I understand they have been very careful to date about the sale of nuclear reactors.

Mr. FRIEDMAN. They have sold nuclear reactors to Soviet bloc members.

Senator HUMPHREY. Not outside, have they?

Mr. FRIEDMAN. One outside.

Senator HUMPHREY. Which one outside?

Mr. FRIEDMAN. Finland.

Senator HUMPHREY. Thank you. Finland is an independent country and she has my love and affection. She knows what the realities are.

Mr. FRIEDMAN. You are correct, Mr. Humphrey, that the Soviet Union is careful and their sales have been accompanied by international atomic energy safeguards as well.

EXTENT OF U.S. PROTEST TO GERMANY

Senator HUMPHREY. The only question on the Brazilian matter is whether this Government went as far as it could with Germany or whether you paid a courtesy call. This has caused great concern among a number of people.

I do not want to draw any final judgment here. The fact is that an enriched total fuel cycle with all the elements, including the enrichment process, went to a country the size of Brazil, with its competence and with its vitality.

Am I right, Senator Symington, in that they have not ratified the Non-Proliferation Treaty?

Senator SYMINGTON. They have not.

Senator HUMPHREY. They have not ratified.

Senator SYMINGTON. Not only have they not ratified it and have not signed it, they have stated that they do not intend to.

Senator HUMPHREY. I think the central question is whether we really made strong protestations, if we really said, "This is contrary to our national security policy. We are involved with European national security. This is contrary to the international interests, contrary to the purposes of the International Atomic Energy Agency."

I wonder whether we really weighed in or kind of looked at it and when it looked like Bechtel or somebody else might get a chance at it, we sort of blinked our eyes.

That is what bothers me. I am not saying that is what happened. We need to know. I have not heard anybody from the German Government say we really protested too hard.

Senator SYMINGTON. In fact they say the opposite. They say we did not protest at all. We have been over that before. They did not have a single protest from any source.

Senator HUMPHREY. Excuse me, Mr. Chairman.

Senator SYMINGTON. Will the Senator yield?

Senator HUMPHREY. I am through.

Senator SYMINGTON. Senator Javits.

Senator JAVITS. I have one question, sir, that I would like to ask in view of the sobering experience of this German deal.

DRAFTING OF U.S. POLICY CONCERNING NPT ENFORCEMENT

To what extent is the executive branch undertaking to draft a strategy or policy for the United States concerning the enforcement of the Non-Proliferation Treaty and its viability in the face of these activities of nonsigners?

Mr. KRATZER. Senator, this is a subject I think it is fair to say that is certainly one of the highest priority subjects in the Department of State. Certainly in my bureau it is subject number one. It is an object of a tremendous amount of attention, both in terms of a general review of the policies and a great deal of attention to each specific agreement and arrangement that we deal with. We are constantly reviewing and modifying the policies in response to the difficulties that we see arise, or where we foresee difficulties.

I want to say, sir, that these are extremely sobering experiences. The Indian nuclear explosion I think is an important lesson to all of us. I think we should take into account that this is a business that is now 30 years old. We began the large-scale production of nuclear material 30 years ago.

There are very few technologies which have diffused to such a limited degree over such a very long period of time as industrial processes go, as have the processes for the production of fissionable material. That is not an accident, that is because we have over the years followed policies designed to avoid proliferation.

The Indian arrangement, I think it should be pointed out—I do not minimize it; it was a very unfortunate development—the Indian arrangement is the only case in the 30-year history when nuclear materials and nuclear explosions have been produced under circumstances where facilities that were provided for peaceful purposes were employed in that way.

In other words, the other four countries, four in addition to ourselves who have acquired nuclear weapons and nuclear explosives, have done that through programs undertaken by themselves and with their own resources.

Our policies are directed against that as well. That is the reason for the Non-Proliferation Treaty. We have always supplied our nuclear assistance under safeguard arrangements. I think we should say that none of our nuclear assistance has led to the development of nuclear explosives or nuclear weapons.

On the other hand, countries can—as I say 30 years have passed. Much of this technology is in the public domain. Countries can go it on their own.

For that reason we formulated, we promoted, and we secured a fairly widespread adoption—I wish it were wider—of a Non-Proliferation Treaty which has the effect not only of applying controls to the nuclear assistance countries obtain from outside their borders, but to their own programs as well. Obviously, we have to persuade people.

We have devoted a great deal of attention to this and we will continue to.

Senator JAVRS. Is the United States drafting a strategy it can conceivably submit to deal with this danger which has been realized in the case of India and now gives us cause for anxiety in the case of Brazil?

Do we have any plans that we are going to put in the cupboard dealing with this problem?

Mr. KRATZER. We do have plans, yes.

Senator JAVITS. How can we find out about them? Can we find out about them in executive session?

Mr. KRATZER. We can go into greater detail in executive session.

Senator JAVITS. Are we in the process of formulating a plan?

Mr. KRATZER. We have a plan and we are in the continuous process of improving on it.

Senator JAVITS. Is that a plan approved by the President?

Mr. KRATZER. Yes.

Senator JAVITS. Mr. Chairman, I hope that consonant with our proper standards we will make an effort to find out what is the plan of our country. In this way, we can have some understanding of the security which is involved and, if we feel it is necessary, have some input.

Senator HUMPHREY. If the Senator would yield at that point, I hope that plan includes a very strong international initiative as Senator Symington and others have been pointing out here. We can lock up our cupboard and be as pure as can be, but this technology is not exactly a secret now. It is known by others. Unless there is an international initiative that ties down this matter, it will get totally out of hand.

In this area from our most recent experiences with the Soviet Union, we found at least one area of agreement. They are very concerned about nuclear proliferation. Here is the other nuclear superpower, not only willing but apparently read to work with us on any kind of international initiative to control the spread of the nuclear weapons technology and of the materials that would lend themselves to that technology.

The idea of just the spread of the technology is out of date now. I really feel there is so much known about the technology by so many countries that really the problem is how to prevent the enriched materials from going into the technology? It is the control over the flow of the materials and the elements.

Is that how you see it?

Mr. KRATZER. There is enough technology in the public domain to enable many countries to go it alone. Not every country, but many.

Senator HUMPHREY. Many countries. The big issue now is how to get a handle on the control of and the movement of the elements that go into a full fuel cycle, for example, that would lend themselves to building a nuclear weapon. It has to be done internationally. There is no other way.

Mr. KRATZER. Very much so.

COUNTRIES INTENDING TO MAKE NUCLEAR WEAPONS

Senator SYMINGTON. A little while ago I asked if you felt that any of these countries, the 30 countries with which we have cooperation agreements were going to make nuclear weapons. Your answer was no. I will read the names of some of those countries: Argentina, Brazil, India which has already exploded a nuclear device, Iran, Israel, Japan, South Korea, South Africa. At least one of those countries has announced that it intends to go ahead and make weapons.

I worry about that and I wish for the record that you will look over your answer to the question.

Mr. FRIEDMAN. I would like to say that except for India, we still have no reason to believe that any of these countries—

Senator SYMINGTON. That is right. One of those countries has announced that it intends to go for nuclear weapons just as soon as possible. I will discuss that with you in executive session.

PROPRIETY OF THIRD COUNTRY SALES OF U.S. TECHNOLOGY

What do you think about the propriety of a nuclear supplier nation selling, to a third nation, U.S. technology without our approval or knowledge?

Would the State Department care to answer that?

Mr. KRATZER. I think that we have to first inquire whether the technology is privately developed or unclassified.

Senator SYMINGTON. Let us take France. France is known to be one of the leading countries in the world on this entire nuclear question. It is selling to third nations technology that was developed on its own, obtained from us without our approval or knowledge.

What is the State Department's reaction to that?

Mr. KRATZER. I do not know the circumstances under which that has occurred.

Senator SYMINGTON. Would you check it and let us know for the record?

Mr. KRATZER. I do not know of any.

REQUIRED DOWNPAYMENT FOR U.S. ENRICHED URANIUM

Senator SYMINGTON. I had a few more questions here. We understand that when a foreign customer wants enriched uranium for reactor fuel, the U.S. Government requires a downpayment, even though the fuel may be delivered years later.

What is that down payment? I will make my questions as short as possible if you will make your answers as short as possible.

Mr. FRIEDMAN. That is a fair exchange.

There is a downpayment which is based on the size of the reactor. A thousand megawatt reactor would have a down payment paid over a period of 3 years of \$3.3 million. That is a very quick and rough answer. The payment is made in three annual installments. The first on the execution of the contract, the others after the first and second year. The advance payment money goes into the general account of the Energy Research and Development Administration. The interest from the advance payments is calculated and used to reduce the price of the separative work units for fixed-commitments contracts.

That is a very quick summary.

Senator SYMINGTON. What is done with this money when it is received?

Mr. FRIEDMAN. The money goes into the general account of the Energy Research and Development Administration. It is not earmarked for uranium enrichment purposes.

Later, these downpayment installments will be credited against the initial amounts due ERDA for enriching services to the customer. At that time, the credits will be taken in account in determining what appropriations are necessary for ERDA.

ADDITIONAL NUCLEAR WEAPONS IN 1980 AND 1985

Senator SYMINGTON. Mr. Vest, would you supply for the record how many additional nations you believe will have nuclear weapons in 1980? Also in 1985?

Mr. VEST. Yes, sir.

[The information referred to is classified and in the committee file.]

NATIONAL SECURITY IMPLICATIONS OF EXPANDING NUCLEAR WEAPONS POSSESSION

Senator SYMINGTON. Thank you. Has the executive branch studied the national security implications of the possession of nuclear weapons by a large and expanding number of nations? If so, what conclusions have been reached? Are there steps that we are or you think we should take to prepare for such a world?

Mr. KRATZER. Mr. Chairman, I cannot answer that question. I understand it. I do not know whether such a study has been made. It really falls outside my area of responsibility.

Senator SYMINGTON. There is a book out in which it states one of the great scientists says we have moved from a possibility to a probability of nuclear explosions in cities in the not too distant future. Also, we have the problem of criminal organizations or organizations, a very intense minority of countries—for example, the Palestinian Liberation Organization. The pessimism worried me to the point that I called up one of the most famous of all nuclear physicists and asked whether or not this man was a nut who predicted this based on the developments. He said he is not only not a nut, but that he designed some of the finest and best atomic bombs, fission bombs that we have.

I would appreciate your answer to that question. Based upon the experience that you gentlemen have had in the nuclear field, would you supply for the record what you think can be done to bring nuclear proliferation under control. Because today I think you can agree with me that so far at least true control has been lacking.

Mr. KRATZER. Yes, sir; we will supply it.

[The information referred to follows:]

NATIONAL SECURITY IMPLICATIONS OF NUCLEAR WEAPONS POSSESSION BY LARGE AND EXPANDING NUMBER OF NATIONS

[Supplied by Department of State]

The major effort thus far has been to define the problem we might face. An intense effort by the Intelligence Community has been directed toward identifying those nations which might undertake nuclear weapons programs in the near term. We have, with some assurance, identified those countries; the steps they must take to achieve their goals, based on current levels of technological development; and the time each would require to achieve nuclear explosive capabilities of varying degrees of sophistication.

At the same time, our studies have identified those critical stages in national nuclear weapons programs that are amenable to nuclear supplier intervention. We have concluded that the exercise of restraint in supply of certain forms of sensitive nuclear materials and technology can be effective in influencing the scope and timing of nuclear proliferation for the foreseeable future.

As a second stage of our study effort, we are identifying the likely patterns in which the acquisition of nuclear weapons by current prospective nuclear weapons states might provide the impulse for similar efforts by additional countries not now believed to be interested in acquiring a nuclear capability. We are also investigating the possible means by which an international flow of nuclear materials and technology might contribute to a decision to proliferate.

Our conclusions are necessarily tentative and subject to change, because the process of nuclear proliferation is itself subject to a number of political and technological variables which cannot be predicted with assurance of accuracy. In general, nations electing to pursue development of nuclear weapons are likely to do so in the context of regional tensions or rivalries.

In all likelihood, these nuclear weapons would not be intended for direct military use against major nations such as the U.S. and U.S.S.R. But the nuclear programs of such potential nuclear weapons states would complicate regional confrontations, pose political problems to the U.S., create risks of the superpowers being drawn into conflict which could involve nuclear weapons, and introduce some chance that regional nuclear conflict could escalate.

We are guardedly optimistic that we will be able to, for 10 to 15 years into the future, inhibit significantly addition to the current number of nations possessing nuclear weapons.

We hope to achieve this objective because of our current national policy and as a consequence of consultations with other supplier nations. There is of course some small possibility that we will not be successful in this goal. To guard against this possibility, we will continue:

(a) to maintain sound reliable nuclear deterrent forces, tactical as well as strategic;

(b) to utilize and improve our world-wide technical intelligence collection and evaluation capability; and

(c) to retain our present overall defense posture; there is no need to increase or to restructure our forces for this purpose.

Senator SYMINGTON. I have asked you questions about the importance of having somebody take the place of that very able Mr. Dwight Porter in Vienna because it always has been my experience that you cannot run something in Europe indefinitely with the headman back here in the United States.

HOW IAEA COULD BE STRENGTHENED

We also would like, if you could, to have your thoughts as to how the IAEA could be strengthened. If so, in what way. Because the false idea has gotten out, and I had it myself for awhile, that there was some meaningful control in the IAEA in Vienna over what other countries did with respect to the development of nuclear weapons. After listening to the story over there, I am convinced there is no meaningful control of any kind whatsoever.

[The information referred to follows:]

How IAEA Could Be Strengthened

[Supplied by Department of State]

The magnitude of the job which the IAEA inspectorate faces in the coming years continues to grow both in magnitude and complexity. Nevertheless, it is clear that the kinds of possible activities in the nuclear power fuel cycle, involving significant quantities of fissionable material, are few in number. The development effort of the Agency and its member states is concentrated on the safeguards techniques and instruments suitable for those activities.

An important area that requires further strengthening is the technical efficiency of materials accountability. No material accountancy system can provide absolute assurance that no nuclear material has been diverted. Absolute assurance of detecting every slight loss is not possible because statistical errors in sampling and measurement set limits of accuracy. However, the IAEA safeguards system is designed to provide a high probability of detecting the diversion of significant quantities of material through containment, surveillance and accountability. It is the judgment of U.S. and foreign safeguards experts who are intimately familiar with the IAEA system that it will presently detect and thus make an important contribution to deterring any efforts at diversion by states. Nevertheless, as the volume of materials increases and as the complex-

ity of the system grows, improved safeguards will be essential. As the possibilities for more reliable measurements of fissionable materials reach practical limits, the importance of surveillance and containment measures will increase, necessitating further development. Both the IAEA and its member states, notably the U.S., are developing instrumentation and advanced equipment to improve the Agency's capabilities to maximize the effectiveness of inspections and to assure that it has access to the most up-to-date techniques.

Further improvements will also be needed in national accountability systems. Although the IAEA does not depend on national systems to conduct its safeguards activities and has the right and capability to verify independently the integrity of nuclear materials, the Agency does make extensive use of national material accountability records. The development of good national accounting will be important to the efficient application of IAEA safeguards. The IAEA is giving strong emphasis to assisting member states in the establishment of national accounting and control systems, and the U.S. has provided assistance to other nations in this regard. The IAEA is planning a training program for national safeguards personnel, especially from the less developed countries engaged in or planning nuclear power programs. The first presentation of such a course is planned for mid-1976. Consideration is also being given within the Executive Branch of the U.S. Government to establishing a course for such personnel under IAEA auspices.

The IAEA will also need to develop and implement an effective safeguards information handling system. During the past few years, a system for the automatic processing and storage of the safeguards data provided by states has been put into operation. Work is continuing on techniques for the automatic and continuous collection of information on the identification containment and flow of nuclear material and items and on the automatic processing of information obtained through inspections and provided by states.

OPERATING NUCLEAR FUEL REPROCESSING PLANTS WORLDWIDE

For the record, Mr. Friedman, would you please provide a list of all the operating nuclear fuel reprocessing plants in the world?

Mr. FRIEDMAN. Yes, sir.

Senator SYMINGTON. Where they are located and to the best of your knowledge those that are planned or under construction. Would you also include the estimated capacity of the plant and the estimate of the annual output of the plutonium from each plant in kilogram units?

Mr. FRIEDMAN. That will be done.

[The information referred to follows:]

FOREIGN (FREE WORLD) FUEL REPROCESSING CAPABILITIES, JULY 1975

[Supplied by Department of State]

1. EXISTING CAPABILITIES, PRODUCTION SCALE

Country	Facility	Type fuels	Design capacity, metric tons uranium per year
United Kingdom	British Nuclear Fuels Ltd., Windscale Works ¹	Metal, low enrichment ²	2,500.
France	La Hague (HAO)	UO ₂ and metal, low enrichment.	800.
Belgium	Marcoule Eurochemic-Mol ³	Metal, low enrichment Metal and UO ₂ low enrichment and metal, high enriched.	1,000. 75 low enriched; 1.25 higher enriched (plant shutdown in mid-1974).
India	Trombay	Metal and UO ₂ low enrichment.	100.

¹ Modification was made at Windscale plant for processing low-enrichment oxide (LWR type) fuels; however, this part of plant has been inoperative but may be restarted in the near future.

² Facilities suitable for low-enriched uranium are also suitable for natural assay uranium.

³ Consideration is being given to restarting of this plant (UO₂, low enrichment) under Belgian ownership and to expand its capacity to 300 metric ton uranium per year.

Comment: With respect to production-scale operations, rough rules of thumb may be used to gauge approximate quantities of plutonium contained in spent fuel: (a) 8 kilograms Pu/metric ton uranium (light water power reactor fuel) (b) 1 to 3 kilograms Pu/metric ton uranium (natural uranium power reactor fuel).

2. PLANNED CAPABILITIES, PRODUCTION SCALE

Country and/or organization	Facility	Type fuels	Year available	Design capacity, metric tons Uranium per year
United Reprocessors, a loose marketing and technology exchange organization among France, Germany, and United Kingdom.	La Hague (France)	UO ₂ , low enrichment	1976-80	Startup at 100 in 1976, increasing to 800 by 1980, by modification to existing plant.
	Windscale (United Kingdom)	do	1981	800.
	KEWA (Germany)	do	1984	1,600.
Japan	PNC, Tokai-Mura	do	Being built	200.

3. PROJECTED CAPABILITY; SMALL-SCALE PLANTS; AND DEVELOPMENT ACTIVITY

Country	Facility	Type fuels	Comment
France	La Hague, Fontenay (AT-1)	Breeder (U-PU oxide)	Pilot plant, near operation (1 kg/day).
Germany	WAK, Karlsruhe	Breeder, UO ₂	200 kg/day pilot plant, in operation.
	KFA, Juelich	Graphite	2 kg/day pilot plant, scheduled to start 1977.
India	Tarapur	UO ₂ , low enrichment	Small plant, startup imminent. (0.5 MTU/day).
Italy	Trombay	Thorium/uranium oxide	Lab-scale facility, in operation.
	EUREX-1-Salreggin	UO ₂ and metal	Small pilot plant, in operation.
	ITREC-Rotondella	Thorium/uranium oxide	Do.
	Unnamed	UO ₂ , low enrichment	500 MTU/yr plant, projected operation in 1985.
Japan	PNC, Tokai-Mura	do	Small plant, scheduled startup 1976. (0.7 MTU/day).
Argentina	do	Metal	Small plant, in operation.
	Ezeiza Nuclear Center	Metal (research reactor fuel)	Lab-scale facility. Has been shut down, but being reactivated for operation in 1977; may include redesign for UO ₂ fuel, low enriched.
Taiwan (Republic of China)	Nuclear Energy Research Institute	Metal	Lab-scale facility, being built.
Spain	do	Thorium/uranium oxide	Lab-scale facility, planned.
Sweden	Juan Vignon Center (Madrid)	Metal	Small pilot plant, in operation.
Sweden		UO ₂ , low enrichment	500 MTU/yr plant being considered for operation by late 1980's.
Yugoslavia	Boris Kidric Institute	Metal	Lab-scale facility, in operation.
United Kingdom	Dounreay	Advanced fuels, breeder etc.	Pilot plant, in operation.
Canada	Chalk River	Natural oxide	Lab-scale facility (not in use).
Other (e.g., Brazil's planned capability with German assistance).			Several other countries have expressed interest in construction of plants for reprocessing of LWR fuels. However, very little work is underway and it is expected that they would have to rely on technology of others.

Senator SYMINGTON. Also, if you would, include if you can the reprocessing plant to be constructed in Brazil by the West Germans. Mr. FRIEDMAN. We will include as much information as we can get. Senator SYMINGTON. Thank you.

URANIUM ENRICHMENT PLANTS

Would you provide for the record a list of all the uranium enrichment plants that are operating, those that are under construction, and those that are planned?

Mr. FRIEDMAN. Yes, sir.

[The information referred to follows:]

FOREIGN URANIUM ENRICHMENT, JULY 1975

[Supplied by Department of State]

1. EXISTING CAPABILITY

Country	Location	Process	Capability/comment
United Kingdom	Capenhurst	Gaseous diffusion	Small plant completed in 1953 for defense purposes; modified for commercial reactor fuel in 1970-75 with capacity of 400,000 SWU/yr.
United Kingdom (URENCO)	do	Gas centrifuge	Developmental cascade operating as of mid 1975 at about 14,000 SWU/yr.
France	Pierrelatte	Gaseous diffusion	Small plant built for defense purposes; operating since 1967. Capacity not explicitly stated, but estimated by several observers at around 500,000 SWU/yr.
Federal Republic of Germany (URENCO) (West Germany)	Almelo (Netherlands)	Gas centrifuge	Developmental cascade operating as of mid 1975 at about 200,000 SWU/yr.
Netherlands (URENCO)	Almelo	do	Developmental cascade operating as of mid 1975 at about 15,000 SWU/yr.
U.S.S.R.		Probably gaseous diffusion.	Built for defense purposes; providing toll enriching services since early 1979's.
Peoples Republic of China (PRC)		do	Built for defense purposes, probably small.
South Africa	Valindaba		South Africa has claimed partial operation of pilot facility as of early 1975.

Comment: The current capacity of the 3 existing U.S. (ERDA) gaseous diffusion plants is over 17,000,000 SWU/yr and, with cascade improvement and uprating (CIP/CUP), will be about 27,700,000 SWU/yr by about 1984. The private diffusion project planned by Uranium Enrichment Associates will add another 9,000,000 SWU/yr in the early 1980's.

2. PLANNED AND PROJECTED RESEARCH AND DEVELOPMENT PROGRAMS

Country and/or organizations	Location	Process	Comment
URENCO (United Kingdom, Federal Republic of Germany, Netherlands)	Capenhurst (United Kingdom) and Almelo (Netherlands)	Gas centrifuge	Additions projected by URENCO leading to 2,000,000 SWU/yr by 1982 and 10,000,000 SWU/yr by 1985.
EURODIF (France, Belgium, Spain, Italy)	Tricastin (France)	Gaseous diffusion	Plant under construction projected at 4,700,000 SWU/yr by 1978 and 10,700,000 SWU/yr by 1983.
South Africa	Not chosen		Announced objective is a 5,000,000 SWU/yr plant for the early 1980's.
Federal Republic of Germany	Karlsruhe	Jet nozzle	Small pilot plant built in 1967 at KfK.
Brazil	Not chosen	do	Part of 1975 agreement with Federal Republic of Germany, would be first production-scale plant and therefore very small but based on 5,000,000 SWU/yr reference design by Steag, AG.
Japan	Tokai-Mura	Gas centrifuge	Growing research programs; experimental cascade operations involving several hundred machines underway; interested in 3-4,000,000 SWU/yr.
Canada, Zaire	Not chosen	Gaseous diffusion	Studies have been undertaken on the advantage of siting in low-electric power-cost areas.
Italy	Various	Gaseous diffusion and gas centrifuge	Modest basic research programs.
Australia	Lucas Heights	Gas centrifuge	Small basic research program since 1965.
United Kingdom, USSR, Israel, Federal Republic of Germany, France, Australia, Sweden, Peoples Republic of China		Processes utilizing laser illumination.	Various countries and groups are interested in laser isotope separation research.
Sweden		Rotating plasma	Small research program.

FRENCH NEGOTIATIONS WITH PAKISTAN

Senator SYMINGTON. Mr. Vest, according to press reports France is negotiating with Pakistan for the sale of reprocessing plants.

Do you know anything about that in the State Department?

Mr. VEST. Yes, sir, but I would have to discuss that in executive session.

Senator SYMINGTON. If you want to discuss it in executive session, of course we will discuss it in executive session.

I would hope now that this situation has broken out, that the people of the world, as well as the people of the United States, realize the genie is out of the bottle. Remember as Dr. Oppenheimer once described it. There were two scorpions in the bottle. Now there are 6 scorpions, and there will be 20 unless we can do something about it. The Soviet Union is very clear in that it would also like to see something done about control of proliferation.

As you know three of the six nations in the nuclear club not only have not ratified, they have not signed the Non-Proliferation Treaty, and they do not intend to do it.

Thank you very much, gentlemen. We will recess the hearing. I want to thank you for your courtesy and tolerance, and for the information you have given us.

[Whereupon, at 4 p.m., the subcommittee adjourned, subject to the call of the Chair.]



NON-PROLIFERATION ISSUES

TUESDAY, OCTOBER 21, 1975

UNITED STATES SENATE.

SUBCOMMITTEE ON ARMS CONTROL.

INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS

OF THE COMMITTEE ON FOREIGN RELATIONS.

Washington, D.C.

The subcommittee met, pursuant to notice, at 2:35 p.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, Clark, and Case.

Senator SYMINGTON. The hearing will come to order.

I have a short opening statement.

OPENING STATEMENT

Last month, the Subcommittee on Arms Control, International Organizations and Security Agreements released a study of the effects of limited nuclear war upon the United States.

This study included analyses by the Department of Defense and the Congressional Office of Technology Assessment, OTA, which show that counterforce attacks against the United States could result in tens of millions of fatalities. Previously, the Pentagon had projected much smaller fatality figures, actually in the hundreds of thousands.

Senator Kennedy, who is testifying before the committee this afternoon, was Chairman of the Board of the Office of Technology Assessment at the time the study was requested, and gave this effort his strong support.

The estimates contained in the new subcommittee study reinforce our questioning of the Pentagon's new nuclear flexible response policy and the proposed new arms expenditures in support of that policy.

One of the new programs is the strategic cruise missile—the subject of today's editorial in the *New York Times*, entitled "SALT II Threatened by Nuclear Arms Race."

Without objection, I will enter the article in the hearing record at the conclusion of these remarks.

At this point there is no certainty that a constructive SALT II agreement can be reached; and there is the danger that the two sides will remain so far apart that any agreement may accomplish little, if anything. So far, neither side has been willing in SALT to allow significant constraints or reductions on their strategic arsenals.

If SALT now fails, we may not have another chance until after the Soviet Party Congress early next year and the American Presidential election next fall. By then both sides would have been making weapons

choices for 2 fiscal years with no serious arms control prospects in sight. As a result, any negotiations resumed in 1977 would proceed on an entirely new basis, and meaningful agreement would be even more difficult and elusive.

If SALT II were only to confirm the Vladivostok limits, and nothing more, the way would still remain for the development of weapons systems in such quantity and quality that, within several years, SALT II would appear a meaningless achievement.

What value, for instance, is there in applying a 2,400 limit on heavy bombers and strategic launchers if 4,000 or 5,000 highly accurate cruise missiles can be built without any limitation or verification.

Similarly, the Russians could put multiple warheads on a far greater portion of their strategic forces, including submarines. They could also develop further and more accurate generations of land- and sea-launched strategic missiles.

Both nations appear to have gone far beyond their military requirements for national security. Neither side would stand to gain by embarking on costly new weapons competitions.

In summary, prospects for meaningful arms control appear in jeopardy.

Major issues at SALT have yet to be reconciled; and the Pentagon's emphasis on limited nuclear war not only is generating increased spending on dangerous new weapons programs, but also appears to be undercutting the very concept of deterrence upon which any meaningful U.S.-Soviet agreement depends.

[The article referred to follows:]

[From the New York Times, Oct. 21, 1975]

SALT II THREATENED . . . BY NUCLEAR ARMS RACE

For thirty years, from the atom bomb to the MIRV multiple warhead, American inventive genius has sought increased security for the country through a series of technological marvels that, when inevitably acquired by the Soviet Union, have heightened the nation's danger. The latest, the cruise missile, has yet to be flight-tested. But it already threatens the negotiations for a historic ten-year Strategic Arms Limitation Treaty (SALT II), placing in doubt Leonid Brezhnev's thrice-postponed 1975 visit to the United States and, with it, the future of détente.

Unless the strategic nuclear arms race is curbed, it is difficult to conceive of détente continuing in its present form. Moreover, Mr. Brezhnev has been counting on his second Washington visit, which was supposed to center around the signing of SALT II, to permit celebration of his American policy—and its favorable economic consequences—as the main theme of the crucial quinquennial Congress of the Soviet Communist party in February.

Mr. Brezhnev already has his critics in the Soviet hierarchy and that criticism is likely to intensify if SALT II cannot be completed in the coming weeks, in time for the party Congress. President Ford will also find it more difficult to make compromise on SALT during next year's Presidential race—especially since he seems to believe that his main competitor is Ronald Reagan, rather than a liberal Democrat.

Failure to complete SALT II soon, therefore, could blow up the whole treaty in mutual recrimination or, at the very least, put off resumption of meaningful negotiations until 1977. That delay, probably of eighteen to 24 months, could see the continuing arms race destroy the framework for the SALT II treaty which was agreed to at last November's Ford-Brezhnev meeting in Vladivostok; and by 1977 one or both of the leaders who reached that agreement may no longer be in office.

At Vladivostok, agreement was reached to limit the aggregate total of strategic offensive missiles and bombers on each side. What threatens SALT II are two delivery systems that were not discussed at Vladivostok, but have loomed large

in the thinking of the military on both sides since then: the new American cruise missile and the new Soviet supersonic, swing-winged jet bomber known as "Backfire."

The issues concerning Backfire—which Moscow insists is a medium rather than a strategic bomber—could be resolved if the Soviet Union will offer adequate assurances that its future numbers and mode of deployment will not comprise a substantial strategic threat to the United States, Soviet training, basing and, above all, aerial refueling capabilities could all be restrained to prove that Backfire's potential use against the United States would be too limited to affect the strategic balance significantly.

American proposals concerning the cruise missile, in contrast, do not provide a basis for negotiation. The cruise missile, a small, subsonic pilotless bomber—which will get its first flight test early next year—can be launched from aircraft and the submerged torpedo tubes of any submarine. It can fly 2,000 miles and land within 30 feet of the target, thanks to on-board computers providing both long-range and terminal guidance.

The American SALT II proposals would place no limits on the deployment sea and land-based cruise missiles and would exclude from the Vladivostok ceiling air-launched cruise missiles with ranges under 2,000 miles. This would permit deployment of tens of thousands of nuclear-armed cruise missiles. The Vladivostok ceiling could hardly survive such a deployment. Gone too would be any hope of Soviet restraint in the deployment of its big, new MIRV-tipped intercontinental ballistic missiles (ICBM's). With increasing missile accuracy, both sides would ultimately acquire a destabilizing "first-strike" capability against the other's land-based forces.

One way to head off this nightmare would be to halt the development and deployment of long-range cruise missiles through a flight-test ban. Once American flight-testing begins next year, that will become increasingly difficult, a further reason why early conclusion of the SALT II treaty is urgently necessary.

A Soviet commitment to deny Backfire a strategic role and to restrain the rate of deployment of its big MIRV-tipped ICBM's might be exchanged for suspension of American flight-testing of long-range cruise missiles. Other bargains are also conceivable. What is needed is political courage at the top in Moscow and Washington to overrule the military and complete SALT II now before both the opportunity and détente are lost.

Senator SYMINGTON. Senator Case.

COMMENDATION OF SENATORS SYMINGTON AND KENNEDY

Senator CASE. Mr. Chairman, I would like to thank you for your initiative in regard to these hearings and pointing out what several of us have been working on for quite some time.

I want to thank Senator Kennedy for his initiative in the matter. He was chairman and I was ranking Republican member of the Office of Technology Assessment when we were able to get this assessment done. He was enormously helpful and I think his own contribution to it was absolutely essential, among other things, in our being able to get together the very fine advisory council that we did on the point. I enjoyed the experience and found it a deeply satisfying one. Mr. Chairman, as has been my association with you in this matter here.

Senator SYMINGTON. Thank you, Senator, it is mutual.

Senator Clark.

Senator CLARK. I have no statement.

Senator SYMINGTON. I would add one small point before we listen to our witness.

GENERAL DE GAULLE'S COMMENT

I ask unanimous consent that at a point in these hearings I insert a dialog from a book written by Mr. Crozier, an Australian, about General de Gaulle in which he quotes De Gaulle in a discussion with

President Eisenhower in 1959. Our President said to him, in effect, "Why do you go on with this nuclear development when you know that you could never equal the Soviet Union?" De Gaulle said, in effect, "In megatonnage you don't have to equal anybody, if you can kill them once that is enough, you don't have to kill them ten times."

That is pretty close to a verbatim comment.

[The information referred to follows:]

EXCERPT FROM "DE GAULLE" BY BRIAN CROZIER (PART V: THE FIFTH REPUBLIC; CHAPTER 2: THE ATLANTIC DIRECTORATE AFFAIR, P. 533.)

"Why do you doubt that the United States would identify its fate with Europe's?" asked Eisenhower.

And De Gaulle reminded him that during the First World War, American help came only after three years of almost mortal trials; and in the second, only after France had been crushed. Nor was this at all strange. That was why France, although faithful to the alliance, was against integration in NATO. As for harmonising—"if one dares to apply this celestial word to that infernal subject"—the use of French and American bombs, this could be done in the framework of direct cooperation between the three atomic powers which he had proposed.

But surely, the American president objected, given the prohibitive cost of such armaments, France would not be able, by a long way, to reach the Soviet level? In reply De Gaulle gave him the doctrine of the French deterrent in its simplest and purest form: "You know very well that on the scale of megatons, a few rounds of bombs would destroy any country. For our deterrent to be effective, all we need is enough to kill the enemy once, even if he has the means to kill us ten times over."

COMMENDATION OF SENATOR KENNEDY

Senator SYMINGTON. With those comments, Senator, may I first congratulate you on the work that you have done in this field, which is significant, and I know, as my colleague will agree, could not be more important for the future of this country and the world. We look forward to listening to what you have to say this afternoon.

STATEMENT OF HON. EDWARD M. KENNEDY, U.S. SENATOR FROM MASSACHUSETTS

Senator KENNEDY. Thank you very much, Mr. Chairman and Senator Case and Senator Clark.

I, too, Mr. Chairman, want to express a warm sense of appreciation to you and to the members of the committee not only for holding this hearing, but also for the work that this committee has done in the whole area of strategic weaponry and the information and good judgment that you have provided to the Members of the Senate and to the country on exceedingly important arms control issues. I think the three Members I am facing here today have been perhaps the most active and interested Members of the Senate. I very much appreciate the chance to make these comments this afternoon and to say that there would probably be no time when it would be more appropriate that this kind of hearing take place.

The chairman mentioned the editorials which have appeared in the New York Times. I think all of us who have been following this issue were heartened by the comments that were made by the Secretary of State some days ago—that the SALT II negotiations are 90 percent

completed—but since that time we have been very much disheartened by the constant barrage of information, reports and leaks that have indicated that the opportunity for further progress is very much in jeopardy. Of course, this development has to be viewed by all Americans with a good deal of alarm, and I want to indicate to the Chair and the members of the committee that I look forward to working with you in keeping this whole area—which is vastly complex and complicated, and about which the American people have such a strong and vital interest—on the front burner as far as this Congress is concerned, and in terms of the national political debate that will take place during the next year. I hope it will not be an issue that will divide the various political parties, but one on which they will be able to join, and indicate the full strength and commitment of the American people, which I believe is very real and very deep—a commitment that the control of nuclear weaponry and the avoidance of nuclear war is still the first objective of American foreign policy.

So often we look at the recent past and think of mistakes in foreign policy; and the members here today have been involved in trying to awaken the conscience of the Nation to the end of placing its priorities in appropriate perspective on issue after issue. We take some satisfaction that we have been able to avoid nuclear confrontation. But current developments being considered in weaponry, I think, are setting our country on a course of madness and I hope we can bring some sense and constructive thought to bear on this issue.

SENATE EFFECTIVENESS IN DEALING WITH PROBLEMS

I would like to say at the outset, Mr. Chairman, that all of us are mindful of the enormous opportunities that the Senate provides for considering issues, but in many respects we lurch from crisis to crisis. Fortunately, there have been important attempts in recent times to try to make the Senate more effective in dealing with problems that we are facing, not only for today but also for the future. The creation of the Budget Committee reflects one of these actions. I would like to believe that the OTA represents another, trying to find ways in which technology can be better harnessed to carry forward our real and true interest of growth and prosperity, and to inform us better about decisions that we make and what those decisions will be in the areas of technology and science. This committee has welcomed the opportunity provided by the existence of OTA. I daresay OTA would not have accomplished this study without the very clear and eloquent persuasiveness of the Senator from New Jersey, which I know is a quality familiar to the members of this committee. This OTA study is extremely important, about which the American people need to be made aware.

EFFECT OF SOVIET ATTACK AGAINST U.S. MISSILES

Mr. Chairman, a year ago we were told by the Defense Department that a Soviet attack against U.S. missiles might only cause 800,000 deaths—a figure more than three times U.S. combat deaths in World War II, and clearly a catastrophe for the Nation. Now, through the research and other efforts of OTA, the Department admits that a militarily significant attack on our ICBM's would cause far more casualties,

perhaps 20 million or more, with untold effects on the rest of the population, and with high levels of casualties in Canada, as well.

Furthermore, even in inflicting these enormous civilian casualties, a significant Soviet attack against U.S. retaliatory forces would not destroy our airborne bombers or any of our missile launching submarines at sea.

Let me draw one inescapable conclusion: That a so-called "limited" Soviet attack on U.S. missile silos would cause such incredible destruction that, for many Americans, there would seem to be little difference between that and direct attack against American cities, themselves. Such an attack by the Soviet Union would still be an act of madness; and it could call forth from this country a devastating attack in return.

Moreover, a small nuclear exchange is likely to lead to a larger war which would effectively destroy both societies and inflict serious damage on other nations. In such a war there could be no winners. In fact a report released recently by the National Academy of Sciences shows that there might not even be any survivors.

ISSUES RAISED BY DOD CONCERNING COUNTERFORCE

Mr. Chairman, as I meet with you today I have a strong sense that we have been through all this before, in the 1960's. I need not remind you that the issues being raised by the Department of Defense concerning counterforce are not new. They were debated at great length during previous administrations and soundly rejected.

Previous administrations also recognized that the demands of stable deterrence have required that both we and the Soviet Union give up efforts to gain a true defense against nuclear attack: as technologically impossible and politically destabilizing—as a threat, in short, to bring on the very nuclear war we are seeking to prevent. This necessary principle was enshrined in the ABM Treaty of 1972, and the protocol to it of 1974, to which I hope the Foreign Relations Committee will give prompt and favorable consideration.

The ABM Treaty and the protocol to it recognize the "blunt, inescapable fact" understood by Secretary McNamara. It is this fact that leads inescapably to the widely shared belief that the Department of Defense is perpetrating a dangerous fraud on the American public, by suggesting that it has found some way to change the basic nature of the nuclear relationship through its counterforce doctrine.

It is important to understand, however, that established U.S. policy does not mean that the United States has no alternatives following a Soviet nuclear attack on us, other than attacking the Russian population. In fact, we have had enormous flexibility in our forces and targeting doctrine for many years. Indeed, we should continue to improve our capability to respond flexibly in the event of a nuclear attack.

But gaining added flexibility is a far cry from improving our capacity to attack Soviet missile silos, and from pushing the qualitative arms race down to the point where we would have a significant chance of destroying the Soviet land-based deterrent. For such a policy not only flies in the face of evidence about civilian casualties—whether intended or merely "incidental" to a counterforce strike. It also will raise grave questions in the minds of Soviet leaders about our overall political and military intentions and, I believe, erode the basis for effective control of the nuclear arms race.

Mr. Chairman, these issues must not be left to military analysts; rather, they belong squarely in the political realm, if civilian control of our Armed Forces is to have any meaning.

I, for one, would also like to see primary involvement of the State Department in making political judgments for nuclear policy, and direct comment on positions of our military planners, especially in regard to counterforce.

ERA OF SUBSTANTIAL OVERALL EQUALITY

We are indeed in an era of "substantial overall equality" with the Soviet Union in strategic terms. In some areas we are ahead; in some they are; but in some there is a realistic military and political balance of weaponry. There is simply no merit for either side in attempting to match all of the other's advantages, when the overall balance is so equal. There is no merit in singling out one element of nuclear power—generally one in which the other side has the "lead"—and saying that it would be decisive in determining the actions of political leaders in a crisis. For the fundamental facts of nuclear balance and overkill make folly of the notion that one side is "ahead" because it can destroy the other 35 times over instead of only 34.

TWO APPROPRIATE U.S. RESPONSES

Mr. Chairman, there are two appropriate responses for the United States. The first is to give up the folly of a "limited counterforce attack," which as I have argued would only reduce the stability of the nuclear arms balance and invite the very nuclear crises we seek to avoid. Instead, we should be emphasizing those weapons based at sea that are our ultimate guarantee of deterrence. There is no value in increasing the risks for all by adopting the counterforce programs put through the Congress this year—on what we now know to be the false assumption that "only" 800,000 Americans would die in a Soviet counterforce attack.

When these programs come up for appropriations we should reopen the debate and decisively reject them.

Second, we must demonstrate that our approach to nuclear weapons policy is less focused on arms building than on arms controlling.

The Department of Defense argues that we can increase Soviet interest in arms control by pursuing a counterforce strategy, but it is unable to explain exactly how this strategy will work. Once we test and develop highly accurate guidance systems, terminally guided MARV, the large Trident missile, or any of the proposed versions of the MX—the new U.S. ICBM—negotiations on these and other issues could become impossible.

Let us then try to settle these issues at the bargaining table in Geneva and not in the halls of the Pentagon and the Soviet Ministry of Defense. Otherwise we will foster an unholy alliance between the arms builders, while the arms controllers watch in helpless impotence as the risks climb and safety falls. The way to reduce any Soviet threat to any part of our deterrent lies not in mimicking the follies they may commit. It lies rather in demanding in the SALT talks that neither side increase by any measure the chances that the world will be engulfed in nuclear war.

NECESSITY OF POLITICAL LEADERSHIP

I am confident that this can be done. But it can only be done if the issue of arms control is taken in hand and settled by the political leaders in both countries. Only if those people with ultimate responsibility for the security of their people will take a more active, forthright concern with problems of controlling the arms race, will we be able to break the hold that the arms builders have on nuclear policy. This is not a novel view. Many of us in the Senate—including you, Mr. Chairman—have argued for strong Presidential leadership for many years. And General Secretary Brezhnev, in the conversations I had with him last year, professed to understand that only top political leadership can end the nuclear spiral, in the mutual interest of both our peoples.

The Soviet leadership has not exercised the decisive influence on its military bureaucracy that is needed. I cannot speculate on the reasons for this lack of action. However, it is a void of leadership that is also apparent in our own country. Our leaders have too often failed to realize that the arms race is not over, the risks are not over, the important work will not be completed without sustained and effective top-level political leadership.

VLADIVOSTOK RESOLUTION

It is for this reason that last January I joined with my distinguished colleagues, Senators Mathias and Mondale, in introducing the Vladivostok resolution. It now has 42 cosponsors, from both sides of the aisle, and in similar form has strong support in the U.S. House of Representatives.

We seek to provide the President with advice on the conduct of the SALT II talks before a treaty or other agreement comes to the Congress for approval. We do not seek to tie the hands of the administration, but rather to give it firm support in negotiating an effective, enduring agreement to begin halting the nuclear arms race. This, I believe, is a right and proper exercise of congressional prerogatives in cooperation, not confrontation, with the executive branch.

Our primary concern in the Vladivostok resolution is to insure that the agreement concluded in Vladivostok last November, between President Ford and General Secretary Brezhnev, becomes a major event in a continuing process of arms control, not the end of that effort. We are particularly concerned to begin placing limits on the qualitative as well as quantitative aspects of the arms race. The agreement on limiting MIRV's is a welcome step. But both countries must go far beyond, if the race in numbers is not simply to be replaced by an equally dangerous and frightening race in technology.

WHAT WE MUST DO

I therefore commend this resolution to the Senate, and wish to make clear that, when any agreement comes to the Congress for approval, many of us will look for real evidence that the objectives of the Vladivostok resolution were pursued by the United States in the SALT II negotiation. It is also critical that neither side now take steps that could make these talks almost worthless. We should exercise the ut-

most restraint in introducing new strategic systems, and should accept a prohibition on strategic cruise missiles. It is inconceivable that we could need both strategic cruise missiles and the B-1, even if one or the other were otherwise justified.

We must also make clear to the Soviet Union its own responsibilities—both in the weapons it deploys, such as the new, larger missiles and the Backfire bomber, and in recognizing that without rapid efforts to control both quantitative and qualitative improvements, both they and we will suffer from a new era of strategic doubt and political uncertainty.

We must also understand the consequences of not applying our best efforts—our top leadership—to the current negotiations: It could well be the collapse of the entire Vladivostok Agreement of last November. Would we be able to join with the Soviet Union to revive the Vladivostok agreement following the U.S. Presidential election? Or would the pace of the arms race have gone so far forward—would the whole process of arms control be in such doubt—that any future agreement would be far worse for both sides? And would we and the Russians so poison the political atmosphere that it would be hard to salvage positive value in détente itself.

I believe that the time has come for the President of the United States to take firm control of the SALT negotiations, and seek, now, the completion of the Vladivostok accords, and the groundwork needed for the next positive step in trying to halt the deadly nuclear spiral. History will judge us and the Soviet Union harshly if we lose this opportunity for moving forward in that vital realm.

Mr. Chairman, issues raised about the future of the United States-Soviet nuclear arms race must be seen in a broader perspective. For it might be possible for Washington and Moscow to dig increasingly deeper into third and fourth generation problems of bilateral nuclear balance and yet invoke a greater danger: the danger of an indiscriminate spread of nuclear weapons around the world. Certainly, it will profit us and the Russians nothing to regulate the forward thrust of our own arms race, if a failure to stop that race, once and for all, only encourages other nations to build the bomb.

So, Mr. Chairman, I welcome this chance to meet with you, today, and again commend your efforts to bring to the American people the potentially horrendous consequences of a change in American strategic doctrine and deployment toward the myth of a limited nuclear war. Based on the new facts you have presented, I believe we should reopen the questioning of funding counterforce programs, and decisively reject them. I believe we should demand of our leaders the decisive action in the budget and at the bargaining table that will help end the nuclear arms race, once and for all.

I would like to ask unanimous consent to include my entire statement in the record.

Senator SYMINGTON. Without objection.

[Senator Kennedy's prepared statement follows:]

PREPARED STATEMENT OF SENATOR EDWARD M. KENNEDY

I am pleased to meet with you this afternoon, to discuss critical issues of nuclear policy and arms control. These hearings, based on work done by the Office of Technology Assessment, can make an important contribution to public under-

standing of the most vital problem facing the United States: the need to prevent nuclear war, and particularly strategic nuclear war with the Soviet Union.

I have welcomed the chance to take part in the founding of the Office of Technology Assessment, and to support its work in studying the complex technical questions related to nuclear effects and arms control. This, I believe, is a valuable and proper use of OTA, helping to provide a much more enlightened and knowledgeable basis for Congressional action. And I particularly value your leadership, Mr. Chairman (Senator Symington), as well as that of Senator Case, in the important debate facing the United States in this area.

In your first day of hearings, on September 18, three members of OTA's Ad Hoc Panel on Nuclear Effects spoke eloquently on the grave problems raised by a doctrine of limited war, or "selective counterforce strikes." A year ago we were told by the Defense Department that a Soviet attack against U.S. missiles might "only" cause 800,000 deaths—a figure more than 3 times U.S. combat deaths in World War II, and clearly a catastrophe for the nation. Now, through the research and other efforts of OTA, the Department admits that a military significant attack would cause far more casualties, perhaps 20 million or more, with untold effects on the rest of the population, and with high levels of casualties in Canada, as well.

Furthermore, even in inflicting these enormous civilian casualties, a significant Soviet attack against U.S. retaliatory forces would not destroy our air borne bombers or any of our missile launching submarines at sea. Thus Soviet motives for such an attack would be difficult, if not impossible, to understand.

Your other witnesses have documented this case, and I do not need to repeat their arguments this afternoon. Let me draw one inescapable conclusion: that a so-called "limited" Soviet attack on U.S. missile silos would cause such incredible destruction that, for many Americans, there would seem to be little difference between that and direct attack against American cities, themselves. Such an attack by the Soviet Union would still be an act of madness; and it could call forth from this country a devastating attack in return.

Thus, Mr. Chairman, I feel that the new estimates of casualties released by your Subcommittee vividly illustrate the folly of the "counterforce" strategy currently being advocated by the Department of Defense. This strategy is founded on the false assumption that a "counterforce" war could somehow keep civilian casualties to "acceptable" levels and could prevent the war from expanding to a point where cities were attacked directly. The new estimates, however, show once again that nuclear warfare is starkly unlike anything we have ever known in the history of conflict. Even small nuclear attacks can result in enormous casualties. Moreover, a small nuclear exchange is likely to lead to a larger war which would effectively destroy both societies and inflict serious damage on other nations. In such a war there could be no winners. In fact a report released recently by the National Academy of Sciences shows that there might not even be any survivors.

The reality of civilian casualties, even in a so-called "limited counterforce" attack, make nonsense of the view, expressed by the Defense Department, that the Soviet Union might try to disarm the U.S. land-based deterrent, and leave us with the awesome decision of beginning an attack against people. The Soviet Union must know that even a silo-busting attack will kill millions of Americans, and would be difficult if not impossible for us to distinguish between a limited attack against strategic targets in the United States and a direct and deliberate attack on U.S. cities, particularly in the confusion that would necessarily accompany any strategic nuclear attack. Even the Commander of the Strategic Air Command, General Dougherty, has indicated that an attack on *Minuteman* "has to be put in the context of the kind of decision that one would have to make in order to attack the heartland of the United States."

Mr. Chairman, as I meet with you today, I have a strong sense that we have been through all this before, in the 1960s. I need not remind you that the issues being raised by the Department of Defense concerning counterforce are not new. They were debated at great length during previous Administrations and soundly rejected. In 1960, then Senator John F. Kennedy argued emphatically that we should not drive "ourselves into a corner where the only choice is all or nothing at all, world devastation or submission." When he became President we developed and deployed the most devastating and flexible military force ever assembled. All of this was, of course, done with the constant support, advice, and cooperation of men like you, Mr. Chairman, on the Committee on Armed Services. We built over 1,000 ICBMs protected in underground silos. We built 41 nuclear missile launching submarines, each with 16 missiles. We maintained a force of nearly 500 long-

range bombers. During that Administration and those which followed, we have made every attempt to increase the flexibility of our strategic forces, to improve our command and control capabilities, and to provide strong conventional defenses. Today our nuclear forces give us great confidence to deter and thus to prevent a nuclear holocaust. At the same time we have acted to keep the nuclear threshold as high as possible; and we have begun an unprecedented cycle of arms control efforts with the Soviet Union.

At the same time, it became clear to the experts and officials who worked in this area during the 1960s that a doctrine of counterforce could not enhance the security of the United States and might diminish it by increasing the apprehensions of our opponents.

Perhaps the most dramatic change of view in this area was that of Robert McNamara. He began his tenure as Secretary of Defense as an advocate of counterforce and, after spending nearly eight years studying the doctrine and the weapons and reasons to support it, abandoned the effort because of what he called the "blunt inescapable fact that neither the Soviet Union nor the United States can now attack the other even by complete surprise, without suffering massive damage in retaliation.

Since that time our policy for building and deploying weapons has centered on a requirement to maintain what was called "a clear and present ability to destroy the attacker as a viable 20th century nation and an unwavering will to use these forces in retaliation to a nuclear attack upon ourselves or our allies." We adopted this policy out of necessity; a recognition of the unique character of nuclear weapons, the unprecedented challenges to world peace that they pose, and the impossibility that any country could "win" a nuclear war.

Previous Administrations also recognized that the demands of stable deterrence have required that both we and the Soviet Union give up efforts to gain a true defense against nuclear attack: as technologically impossible and politically destabilizing—as a threat, in short, to bring on the very nuclear war we are seeking to prevent. This necessary principle was enshrined in the ABM Treaty of 1972, and the protocol to it of 1974, to which I hope the Foreign Relations Committee will give prompt and favorable consideration.

The ABM Treaty and the protocol to it recognize the "blunt inescapable fact" understood by Secretary McNamara. And it is this fact that leads inescapably to the widely-shared belief that the Department of Defense is perpetrating a dangerous fraud on the American public, by suggesting that it has found some way to change the basic nature of the nuclear relationship through its counterforce doctrine.

It is important to understand, however, that established U.S. policy does not mean that the United States has no alternatives following a Soviet nuclear attack on us, other than attacking the Russian population. The decision to abandon a policy of building weapons capable of threatening the Soviet retaliatory capability never meant that the United States would only use its weapons against civilians. To argue otherwise is a gross distortion of the record. No one has ever disputed the fact that we should have adequate flexibility to attack a variety of targets. I have tried to make it clear that this was a central objective of the forces deployed during the 1960s. In fact, we have had enormous flexibility in our forces and targeting doctrine for many years. There has never been a rule saying that a first nuclear salvo must bring forth retaliation against cities. There is nothing to prevent the improvement of command and control arrangements and of means to permit rapid retargeting of missiles and aircraft. Indeed, we would continue to improve our capability to respond flexibly in the event of a nuclear attack.

Mr. Chairman, as we have built added flexibility into our strategic forces, we have been concerned that the first nuclear explosion not lead automatically to a strategic nuclear holocaust that would mean the end of civilization as we know it. But can a nuclear war be controlled once it has started? This is a problem that has plagued us since the dawn of the nuclear balance. For years, our best experts have cautioned against thinking that there can be a "cheap" or "clean" nuclear war of any kind. This view has been echoed recently by the new Commandant of the Marine Corps, General Louis H. Wilson. He finds it "very, very difficult to believe" that a nuclear war could be contained following the use by either side of even small nuclear weapons on a battlefield. If this is so, how much greater risk either side would run by making "surgical nuclear strikes" against enemy missile silos a part of its policy. This is an argument against a counter-

force strategy that is as compelling as the high number of civilian casualties in a first nuclear exchange, even one limited to strategic targets.

But gaining added flexibility is a far cry from improving our capacity to attack Soviet silos, and from pushing the qualitative arms race down to the point where we would have a significant chance of destroying the Soviet land based deterrent. For such a policy not only flies in the face of evidence about civilian casualties—whether intended or merely “incidental” to a counterforce strike. It also will raise grave questions in the minds of Soviet leaders about our overall political and military intentions and, I believe, erode the basis for effective control of the nuclear arms race. Any sustained Soviet effort to be able to threaten our deterrent would also raise profound questions.

Are the Russians seeking to acquire such a capability? Many people argue that this is so, on the basis of new, large missiles now being deployed. Of course concern with these deployments—as well as Soviet concern with U.S. counterforce programs—ignores the rest of the two strategic arsenals: including bomber and all the invulnerable missiles based in submarines at sea, with each submarine packing more explosive power than was used by all sides in World War II. Even with Soviet large missiles and our counterforce programs, neither side could launch a nuclear attack without risking almost total destruction in return. I am therefore deeply disturbed by the comment by Secretary of Defense Schlesinger, in his letter of October 3rd to Senator McClellan, that we might have to return to a “launch on warning” concept to insure the long-term survivability of our land-based missiles. By introducing this highly-destabilizing concept, in ignorance of our bombers and submarines, I believe we would only tend to heighten tensions, and reduce the chances for real arms control.

It is also important to note another element of the strategy being proposed by the Department of Defense. New nuclear weapons programs are justified to a large degree on what can only be considered to be political judgments, rather than on analysis of military needs. For example, according to the most recent “Posture Statement” issued by Secretary of Defense, the first requirement for deciding on new strategic weapons is the requirement for maintaining “equivalence” with the Soviet Union. It is explained that we must match Soviet programs, not just in terms of substantial overall equality, which we surely have but rather item by item, detail by detail. Supposedly, this is necessary to support foreign policy in other areas and to insure success in the SALT negotiations. Likewise, judgments about the “acceptability” to the United States of different levels of civilian casualties are surely political rather than military decisions.

Mr. Chairman, these issues must not be left to military analysts; rather, the belong squarely in the political realm, if civilian control of our armed forces is to have any meaning. In particular, greater weight should be given to the view of the Department of State. In fact, what Secretary Kissinger has said in the past appears to contradict the judgments of the Department of Defense in some critical, political areas of nuclear policy. He told the Senate Committee on Foreign Relations last year, for example, that: “When nuclear arsenals reach levels involving thousands of launchers and over ten thousand warheads, and when the characteristics of the weapons of the two sides are so incommensurable it becomes difficult to determine what combination of numbers of strategic weapons and performance capabilities would give one side a militarily and politically useful superiority.” If we have reached this point, there is little merit in trying to produce an exact balance of forces, in each aspect of these forces. I, for one, would also like to see primary involvement of the State Department in making political judgments for nuclear policy, and direct comment on positions of our military planners, especially in regard to counterforce.

We are, indeed, in an era of “substantial overall equality” with the Soviet Union in strategic terms. In some areas we are ahead; in some they are; but in sum there is a realistic military and political balance of weaponry. There is simply no merit for either side in attempting to match all of the other’s advantages, when the overall balance is so equal. There is no merit in singling out one element of nuclear power—generally one in which the other side has the “lead”—and saying that it would be decisive in determining the actions of political leaders in a crisis. For the fundamental facts of nuclear balance and overkill make folly of the notion that one side is “ahead” because it can destroy the other 35 times over instead of only 34. Such an arcane calculus has no strategic merit; it has no political or psychological merit unless we say it does, and decide to act on that basis; it provides us with no answer to the question: “How much is enough?” In fact, the answer comes back from the Pentagon: “Nothing

is too much"—an answer thoroughly discredited in the 1960s, as we recognized the imperative need for arms control, not arms anarchy.

Mr. Chairman, there are two appropriate responses for the United States. The first is to give up the folly of a "limited, counterforce attack", which as I have argued would only reduce the stability of the nuclear arms balance and invite the very nuclear crises we seek to avoid. Instead, we should be emphasizing those weapons based at sea that are our ultimate guarantee of deterrence. There is no value in increasing the risks for all by adopting the counterforce programs put through the Congress this year—on what we now know to be the false assumption that "only" 800,000 Americans would die in a Soviet counterforce attack. For that can only contribute to a further cycle of madness in the nuclear arms race, while actually reducing the overall security of all concerned.

Perhaps an even greater danger inherent in the counterforce strategy, however, is its potential for interfering with arms control negotiations, which offer the only real prospect for ending the recurring cycles of arms buildup—of arms anarchy. Our second response to the new Soviet programs should therefore be to demonstrate that our approach to nuclear weapons policy is less focussed on arms building than on arms controlling.

If we persuade ourselves that we must build new weapons to support the counterforce strategy, how can we offer proposals for limiting new types of weapons? Indeed, even a small US program designed to attack the Soviet ICBM force is likely to lessen Soviet interest in arms control, by increasing Moscow's interest in replacing its ICBM force with less vulnerable systems such as mobile missiles or new submarines. The Department of Defense argues that we can increase Soviet interest in arms control by pursuing a counterforce strategy, but it is unable to explain exactly how this strategy will work. Once we test and develop highly accurate guidance systems, terminally guided MARV (or precision-guided re-entry vehicle—PGRV), the large Trident missile, or any of the proposed versions of the MX—the new US ICBM—negotiations on these and other issues could become impossible. The United States has taken the lead in most new types of nuclear technology: therefore, the decision whether to expand the competition in arms into new areas is largely in our hands.

Let us then try to settle these issues at the bargaining table in Geneva—in the interests of both sides and of all mankind—and not in the halls of the Pentagon and the Soviet Ministry of Defense. Let us reopen the issue of funding counterforce programs; and decisively reject them. And let us demand equal restraint on the part of the Soviet Union. For otherwise we will foster an unholy alliance between the arms builders, while the arms controllers watch in helpless impotence as the risks climb and safety falls. The way to reduce any Soviet threat to any part of our deterrent is not in mimicking the follies they may commit. It lies rather in demanding in the SALT talks that neither side increase by any measure the chances that the world will be engulfed in nuclear war.

I am confident that this can be done. But it can only be done if the issue of arms control is taken in hand and settled by the political leaders in both countries. Only if those people with ultimate responsibility for the security of their people will take a more active, forthright concern with problems of controlling the arms race, will we be able to break the hold that the arms builders have on nuclear policy. This is not a novel view. Many of us in the Senate—including you, Mr. Chairman—have argued for strong Presidential leadership for many years. And General Secretary Brezhnev, in the conversations I had with him last year, professed to understand that only top political leadership can end the nuclear spiral, in the mutual interest of both our peoples.

Yet Soviet leadership has not exercised the decisive influence on its military bureaucracy that is needed. I cannot speculate on the reasons for this lack of action. However, it is a void of leadership that is also apparent in our own country. Here, the answer seems to be largely the lack of attention accorded to vital issues of arms control. With Vietnam, Watergate, the economy, and energy, our leaders have too often failed to realize that the arms race is not over, the risks are *not* over, the important work will *not* be completed without sustained and effective top-level political leadership. Furthermore, as Secretary Kissinger himself has said:

"My impression from what I have observed is that both sides have to convince their military establishments of the benefits of restraint and that it is not a thought that comes naturally to military people on either side."

And as Dr. Fred Ikle, Director of the Arms Control and Disarmament Agency,

has recently written: ". . . a new generation of nuclear planners is discussing nuclear strategy" in a very stylized, simplistic fashion," and tends to "ignore the risks inherent in nuclear war."

It is for all these reasons that last January I joined with my distinguished colleagues, Senators Mathias and Mondale, in introducing the Vladivostok Resolution. It now has 42 cosponsors, from both sides of the aisle, and in similar form has strong support in the U.S. House of Representatives.

In this resolution, we seek to take responsibility for nuclear policy—and arms control—out of the Pentagon and put it back where it rightly belongs: with our top political leadership. We seek to provide the President with advice on the conduct of the SALT II talks before a treaty or other agreement comes to the Congress for approval. In this unprecedented act, we do not seek to tie the hands of the Administration, but rather to give it firm support in negotiating an effective, enduring agreement to begin halting the nuclear arms race. This, I believe, is a right and proper exercise of congressional prerogatives in cooperation not confrontation with the Executive Branch. I am pleased that this resolution has been endorsed by the Departments of State and Defense, and by the Arms Control and Disarmament Agency.

Our primary concern in the Vladivostok Resolution is to ensure that the agreement concluded in Vladivostok last November, between President Ford and General Secretary Brezhnev, becomes a major event in a continuing process of arms control, not the end of that effort. We are particularly concerned to begin placing limits on the *qualitative* as well as *quantitative* aspects of the arms race. The agreement on limiting MIRVs is a welcome step. But both countries must go far beyond, if the race in numbers is not simply to be replaced by an equally dangerous and frightening race in technology.

I therefore, commend this resolution to the Senate, and wish to make clear that, when any agreement comes to the Congress for approval, many of us will look for real evidence that the objectives of the Vladivostok Resolution were pursued by the United States in the SALT II negotiation.

Yet even if real talks on the qualitative arms race were to begin before the expiration of the 1972 Interim Agreement—in October 1977—it is critical that neither side now take steps that could make these talks almost worthless. For our part, as the OTA report and these hearings make clear, we should give up the folly of building counterforce weapons, and of changing U.S. strategic doctrine to imply that a limited nuclear war is possible. We should exercise the utmost restraint in introducing new strategic systems—and should accept a prohibition on strategic cruise missiles. Not only would these missiles vastly complicate the problem of verification, perhaps making it impossible to solve but they also add only marginally to our deterrent capabilities. Even in seeking to maintain the third leg of our deterrent triad—manned bombers—it is inconceivable that we could need *both* strategic cruise missiles and the B-1, even if one or the other were otherwise justified.

We must also make clear to the Soviet Union its own responsibilities—both in the weapons it deploys, such as the new, larger missiles and the *Backfire* bomber, and in recognizing that without rapid efforts to control both quantitative and qualitative improvements, both they and we will suffer from a new era of strategic doubt and political uncertainty.

In particular, both sides should give immediate and serious attention to slowing or preventing further competition in nuclear technology, by placing a ceiling on the number of permitted missile flight tests and by prohibiting new generations of ICBMs. In this regard, I was interested to note that Secretary of the Air Force McLucas last year told you, Mr. Chairman, that limits on missile flight testing would virtually eliminate improvements in missile accuracy.

Mr. Chairman, as we look to the SALT II talks, I am increasingly disturbed by reports that there may be no agreement this year. While Secretary of State Kissinger said on *Meet the Press* a week ago that "About ninety percent of the negotiation is substantially completed," other Administration sources seem to be preparing the American people for failure.

I agree with the argument that each SALT agreement should be judged on its own merits, to determine that it is genuinely in the interests of our national security. Each agreement must "have value in its own right," going beyond any positive impact that it could have on the overall political process we call *detente*.

Yet we must also understand the consequences of not applying our best efforts—our top leadership—to the current negotiations: it could well be the

collapse of the entire Vladivostok Agreement of last November. Would we be able to join with the Soviet Union to revive the Vladivostok Agreement following the U.S. Presidential election? Or would the pace of the arms race have gone so far forward—would the whole process of arms control be in such doubt—that any future agreement would be far worse for both sides? And would we and the Russians so poison the political atmosphere that it would be hard to salvage positive value in *detente* itself.

I believe that the time has come for the President of the United States to take firm control of the SALT negotiations, and seek, *now*, the completion of the Vladivostok Accords, and the groundwork needed for the next positive step in trying to halt the deadly nuclear spiral. There is now widespread questioning in the United States about some steps in *detente*. But however that issue is resolved, there can be no questioning about the imperative need to continue the work of arms control. Of course, agreements on arms control will be achieved only if they are in our *mutual* interest. This is no "zero-score game": it is a process of gaining security for both sides. And history will judge us and the Soviet Union harshly if we lose this opportunity for moving forward in that vital realm.

I believe that the debate on *detente* has itself ignored some important realities: including the reality of how far we have come in relations with the Soviet Union since the Cuban Missile Crisis and the days of an unstable balance of nuclear terror. As Secretary of State Kissinger said recently on *Meet the Press*:

"The fact of the matter is there are certain basic conditions that bring about this policy (*of detente*). The fact that the Soviet Union and the United States possess nuclear weapons capable of destroying humanity. The fact that we impinge upon each other in many parts of the world, so that we are, at one and the same time, rivals and yet we must regulate our conduct in such a way that we do not destroy humanity in conducting our disputes. We are ideological opponents, yet in a way we are doomed to coexist.

Those are the realities. They cannot be removed by rhetoric, and those are realities to which every President has been brought back throughout the history of the post-war period.

This, I believe, states in a compelling way the urgent need for us to get on with the SALT II talks.

Mr. Chairman, issues raised about the future of the US-Soviet nuclear arms race must be seen in a broader perspective. For it might be possible for Washington and Moscow to dig increasingly deeper into third- and fourth-generation problems of bilateral nuclear balance and yet invoke a greater danger: the danger of an indiscriminate spread of nuclear weapons around the world. Certainly, it will profit us and the Russians nothing to regulate the forward thrust of our own arms race, if a failure to *stop* that race, once and for all, only encourages other nations to build the bomb. It does not take the equivalent of 700,000 Hiroshima bombs, in the arsenals of the two superpowers, to have a nuclear war: it takes only *one* Hiroshima bomb in the hands of a country disposed to use it. Regrettably, it is all too easy to forget Hiroshima; and half the people on earth had not yet been born in 1945. We can only hope that the leaders of the world will remember the terrible consequences of nuclear war, as portrayed so vividly in John Hersey's book, *Hiroshima*.

Of course, a sound non-proliferation strategy must have many elements, including an immediate, mutual moratorium on nuclear testing by the superpowers, and the prompt negotiation of a Comprehensive Test-Ban Treaty. One other critical element is a rapid end to the Soviet-American nuclear arms race—not the tortoise-like efforts of the year since Vladivostok. For only in breaking loose from old and sterile preoccupations of the past can we meet the real challenges of the future in this vital area of nuclear weapons.

Finally, Mr. Chairman, I would like to raise a broader issue: One of the great ironies of contemporary civilization is that we seem better able to solve difficult technical problems than we are to generate the necessary political will to control this technology, even when we have an overwhelming incentive to do so. We have built weapons which use the terrifying energy processes of the sun, and have devised automatic navigation systems able to steer missiles a third of the way around the globe to within a fraction of a mile of their intended targets. Yet it is rare that decisions leading to technological achievements such as those are governed by anything other than the internal logic of science and engineering. The "next step" is often taken simply because it could be taken; not because there was a conscious, balanced judgment that our security—or the world's—would benefit as a result.

What we have done so far in arms control is significant mostly is setting the stage for real limits in the future. Achievements so far have been cruelly disappointing to those people who expected them to have a significant impact on the momentum of the arms race. If anything the pace is now accelerating. Even with limits forecast for a new SALT agreement, we can expect the United States and the Soviet Union to develop an enormous number of new weapons technologies during the next few years. The United States is developing maneuverable reentry vehicles, advanced propellants, air-launched ballistic missiles, land mobile missiles, new warhead designs, new inertial guidance technologies, long range cruise missiles fired from aircraft or from ships at sea, and a variety of other small improvements which, taken together, could lead to substantial improvements in throw-weight, accuracy, and target coverage. On the Soviet side we are seeing new ICBM systems (possibly including a land-mobile ICBM), deployment of large number of MIRVs, improvements in missile accuracy, and the development of a new bomber, the *Backfire*. And there are the risks of new developments, by other nuclear powers, plus the spread of the bomb to yet more nations.

Mr. Chairman, arms control negotiations have simply been unable to keep pace with the furious pace of strategic technology. New devices are being developed so rapidly that we are scarcely able to find ways of managing one generation of technology, before we are overtaken by the next. In fact, it is possible that protracted negotiations have actually *encouraged* arms competition in some areas rather than reducing it. And it is clear that we and the Soviet Union are building some weapons less for their military value than for their supposed usefulness in political bargaining. As the bargaining drags on, these weapons mature and are deployed: few if any are ever bargained away. There is also a temptation to use the negotiations to inflate the importance of "nuclear numerology"—such as matching numbers of warheads and the weight of missiles. Similarly, there are times when the urge to "get in under the wire" tempts us to rush through programs before they are limited by the negotiations process. We have seen this trend, for example, in our program to accelerate nuclear testing above the 150 kiloton limit which might be imposed by the "threshold test ban agreement."

In general, by delaying negotiations through all of these means, we are getting the worst of both worlds: we are buying weapons we do not need for military purposes, and we are then unable or unwilling to abandon these so-called "bargaining-chips" under almost any circumstances.

Even worse is the attitude of cynicism and hopelessness which these difficulties and repeated failures have engendered in many observers. It is easy to become discouraged by the energy and resourcefulness of the people and institutions working on weapons technology and by the enormous economic incentives which motivate some of them. With increasing frequency, therefore, we hear the argument that it is simply impossible to stop or even to slow the arms race. Yet this is an argument which mankind cannot accept. We cannot indulge in prophecies of doom—for the consequences of failure are too great to allow us to make anything less than our best efforts to halt the arms race; and do it now. It is becoming abundantly clear that only negotiated arms control—combined both with judicious use of self-restraint on each side, and a deflation on rhetoric extolling nuclear weapons as instruments of national policy—can turn us back from the threat of nuclear catastrophe.

And so, Mr. Chairman, I welcome this chance to meet with you, today, and again commend your efforts to bring to the American people the potentially horrendous consequences of a change in American strategic doctrine and deployments towards the myth of a limited nuclear war. Based on the few facts you have presented, I believe we should reopen the questioning of funding counterforce programs, and decisively reject them. And I believe we should demand of our leaders the decisive action in the budget and at the bargaining table that will help end the nuclear arms race, once and for all.

COMMENDATION OF SENATOR KENNEDY'S STATEMENT

Senator SYMINGTON. May I say it is a very fine statement. It discusses in detail what we believe is the important problem the people of the United States and the rest of the world face today.

The revised Pentagon figures of the study on the effects of limited

nuclear war indicate that 50 percent of the people who live in Missouri would be killed from an attack on the ICBM base located there. I haven't discussed that with them in any detail, but I can surmise that they would not consider that a good policy on the part of their Government.

Tomorrow I am going to your State to talk on proliferation and counterforce and I am very much impressed with the remarks that you have made here today on the question of counterforce.

I have six questions that I would ask. I will be careful not to exceed my time, and then I will yield to my colleagues.

IMPORTANCE OF INCLUDING CRUISE MISSILE IN SALT II AGREEMENT

The first is, do you believe that any SALT II agreement can be of significant benefit if the cruise missile is not covered?

Senator KENNEDY. I would prefer that the cruise missile were included. Mr. Chairman. We have mentioned in the Mathias-Mondale-Kennedy resolution the importance of making an agreement in the areas that would include the cruise missile. We tried in our resolution to get a commitment from the administration that it would discuss weapons like the cruise missile at the current SALT talks. Although we could not get such an agreement from the Department as a condition for its support of the resolution, the Secretary did indicate that there would be followup in these areas.

I firmly believe it essential that we get agreement on the cruise missile at some point, and that it is only when we get some agreement on it that we can take a meaningful step. I would hope that we could. I wouldn't put a condition on a SALT agreement relating to that, but I would think that any meaningful agreement at SALT would have to set the process in motion for agreement on cruise missiles.

Senator SYMINGTON. Thank you. My second question:

HANDLING OF PENETRATION BOMBER ISSUE IF CRUISE MISSILE BANNED

If cruise missiles were banned, how should the penetration bomber issue be handled, in your opinion?

Senator KENNEDY. It seems to me that we have to go back to the more basic issue and that is the justification for either the cruise missile or the B-1 bomber.

As I mentioned very briefly, it seems to me that the case even for the B-1 has not been made, and certainly I don't see how the case can be justified for both the cruise missile and the B-1. It seems to me we are under heavy responsibility to demand such justification for that particular item or strike the appropriation. I personally don't see the justification for it and that is why I have expressed the belief that we ought to strike funds for it.

Senator SYMINGTON. I think you have in effect answered my next question. I have three more.

SOVIET THINKING ON FLEXIBLE RESPONSE DOCTRINE

What do you believe the Soviet thinking is in regard to the flexible response doctrine?

Senator KENNEDY. It seems to me, Mr. Chairman, that this doctrine has served the United States well over a period of years in the post war period. It was an essential aspect of deterrence, and it is one which I support, though I personally feel that some weapons are more effective—in particular the various submarine weapons—the Polaris and Poseidon. The kind of response doctrine that has been a part of our defense posture continues to serve us well. I think it is respected by the Soviet Union and I think that adding to that flexibility ought to be an aspect of our defense posture; but, as I mentioned in my statement, I think the counterforce argument does not increase that kind of flexibility, but rather adds an entirely new dimension which I think is unsettling to the Russians.

SOVIET PLANS FOR LIMITED NUCLEAR WAR QUESTIONED

Senator SYMINGTON. It is my understanding that our own military believe and say, to the best of their knowledge, that the Soviets have no plans for what we term a limited nuclear war.

Would you care to comment on that?

Senator KENNEDY. I don't think there is very much that I could add to that, Mr. Chairman, in trying to interpret what the Soviet motivation is in this particular area. I don't think any of us can predict with any degree of certainty, other than what we can know as a fact and what they would know as a fact: that any kind of strike against the United States could bring about the complete annihilation and destruction of the Soviet Union. I think that is something which they understand completely. The idea which is the basis of the counterforce argument is that there can be some kind of a sanitized strike that would bring some degree of hesitancy by an American President. That he would hesitate to respond in an appropriate way, is, I think, completely unrealistic. That argument is made, I know, by defense planners in the United States, but I think that is an argument which has little basis in terms of legitimacy or political understanding. The study that was done by OTA, which indicates the massive destruction from a counterforce strike should make that point even clearer.

WEAPONS SYSTEMS MOST IMPORTANT TO CONTROL

Senator SYMINGTON. We talk constantly about the Soviet Union as the possible enemy. However, based on our studies regarding the rapid proliferation of plutonium all over the world—including such deals as the German-Brazil deal—I think that fairly soon we will have to consider these defense planning problems on the basis of what many other countries may do, in addition to the Soviet Union.

Of the weapon systems you discussed on both sides, which do you believe are the most important to control?

Senator KENNEDY. Mr. Chairman, we have obviously a dual responsibility: one, controlling existing weapon systems; and, two, controlling the development of planned weapons.

Any approach toward the control of the process has to take into consideration both of these elements. It will do so only if it takes into consideration the whole area of planning and development of weapons.

systems which are currently being planned, including the MARV and other such advanced strategic weapons system which could so escalate the qualitative race as to make any agreements in the quantitative race virtually meaningless.

Limitations in the quantitative race have about reached their limit; it is the qualitative area which now poses our greatest challenge. Once developed and deployed, these weapons are going to make further agreements virtually unattainable, and that is why at this moment, as your opening statement has pointed out, this area is of such importance.

POSSIBILITY OF RESUMING MEANINGFUL TALKS IF SALT II FAILS

Senator SYMINGTON. If SALT II fails, given the impact that failure could have on both sides, can we be sure that meaningful talks could be resumed at a later time?

Senator KENNEDY. As you would know, Mr. Chairman, there is a moment in terms of negotiations on weapon systems, or in the course of life, that has to be grasped and this certainly is the moment in terms of these weapon systems. Your statement concerning the deferral of these arms control actions for another 2 years, until a new administration is able to deal with these issues, is correct. Such deferral would permit the kind of unbridled acceleration which I think poses the greatest and most serious threat to the security of the people in this country, to the security of the people in the Soviet Union, and to people throughout the world. That is why this moment is of such great importance and why it needs to be grasped—although I would hope that there would be a continuing effort, even after some progress is made in these areas, on the different issues where the United States and the Soviet Union have very considerable interests. These include proliferation, not just of weaponry, but also of nuclear materials, which obviously has tremendous importance and consequence around the world. The proliferation of this material has wide implications both in terms of the security of our own people and the cause of peace in the world.

So we have a great deal left to do even with these agreements, and we can't wait another 2 years to get down to the business of doing it.

Senator SYMINGTON. Thank you.

Senator CASE.

Senator CASE. Thank you.

Thank you again, Senator, for a very comprehensive statement.

MINIMUM SALT II SHOULD CONTAIN

Picking up the question the chairman asked about the unfortunate consequences if SALT II should fail, I would like you to elaborate as to what in your mind would be a minimum for SALT II to contain if it is not to be regarded as a failure?

It is a hard question because there are so many different mixes. If you have any specifics, we would love to have them.

Senator KENNEDY. I would think, Senator Case, the limitations identified in the Vladivostok Agreement would be an absolute minimum, perhaps leaving out the cruise missile and the Backfire bomber—

if we are unable to get some kind of tradeoff—but with a clear understanding to hold off further development of both systems until we have a reasonable opportunity to reach a further agreement. In this way, our interests would be preserved, while providing a reasonable compromise between the United States and the Soviet Union and securing progress in the other areas. It seems to me that this approach would be the bare minimum.

Senator CASE. Actually those two systems are the ones that have come in for general discussion since SALT I.

INVITING SECRETARIES KISSINGER AND SCHLESINGER SUGGESTED

I was struck by the point you made about the importance of the civilian side of the government in the Soviet Union and in the United States in keeping in command of the situation. I fully agree with that principle.

It occurs to me maybe it is about time we asked Secretary Kissinger to come up and give us his ideas directly on the matter, and very soon. I know he is very busy. Maybe both he and Secretary Schlesinger could at least eliminate some of what now seems to be confusion as to where they agree and where they disagree and exactly what this counterforce doctrine is that the Defense Department is seemingly pushing. I think it would be a great idea to have our hearings open to those two eminent citizens as soon as we can.

Senator SYMINGTON. I would agree with that.

U.S. UNILATERAL ACTION IF SALT FAILS

Senator CASE. You may think it is inappropriate now and I am not sure it isn't, but do you have anything to say about what we ought to do, on a unilateral basis, if SALT fails?

I do not necessarily want to get into that question myself. Yet I think we ought to have some general idea as to where we stand on that matter, because if we pin everything on SALT that gives the unreasonable party a very great advantage in the negotiations.

Senator KENNEDY. A collapse of SALT would be tragic and unfortunate. This is one reason why I would—

Senator CASE. Sure.

Senator KENNEDY [continuing]. I would underscore your point about having these essentially political decisions made by civilians, rather than leaving them to the military.

I shudder to think of what would happen if there were a breakdown of the SALT negotiations; but I would like to believe that the President will make every best effort to try to achieve meaningful control in these areas. If those best efforts were made, and SALT still collapsed, we should think about some kind of limited moratorium on the development of various weapon systems for a short and specific period. This could be announced as an indication of what we were attempting to do in arms control, while maintaining substantial overall equality with the Soviet Union and seeking a corresponding action on the other side. We would announce our intentions and that we would expect corresponding action on the other side; we would indicate that, if the

Soviet Union responded, we would continue to have a moratorium on certain weapon systems for a period of time, to see whether that could provide a positive initiative.

Senator CASE. That general tactic has precedent in President Eisenhower's administration and President Kennedy's administration. It was successful in both cases and I think it is a most useful suggestion for us to keep in mind.

Thank you.

Senator SYMINGTON. Senator Clark.

Senator CLARK. I have a couple of specific questions and a very general question. Please forgive the general one, but it is one about which I have been thinking a lot lately.

UNITED STATES AND SOVIET RESOURCES ALLOCATIONS QUESTIONED

Isn't it true, Senator Kennedy, that the United States and the Soviet Union may really be missing the boat in the sense that we both are so preoccupied with this nuclear race and arms race that we are spending much of the world's resources, maybe \$200 billion a year, looking at each other and really in a sense backward at the cold war, looking really at the old problems. As a result we continue to spend at the enormous rate we have been discussing today when in fact the world has changed in this period so much that the real future of foreign policy in the world, the areas where we are really going to get into trouble in terms of national defense are much more in economic areas.

As we look at the United Nations and look at the world generally, most of the rest of the countries of the world are now looking at the two superpowers with a rather accusative eye, the nonaligned world in particular. They are saying in effect, a plague on both your houses; you are using up all our resources on weapons neither of you could use on the other without destroying yourself.

Wouldn't we be wise in our own national defense interest to start looking at problems with our resources and our money rather than continue this arms race? Isn't it in the mutual interest of the Soviet Union and the United States to do that?

Senator KENNEDY. I agree with you, Senator Clark. It seems to me that, listening to the debate and seeing how we have allocated our resources—particularly in the area of the strategic arms race—we are allocating billions of dollars for very marginal advantages. As the debate, which was held under classified circumstances, on the MARV indicated, the Congress was being asked to spend billions of dollars for extremely marginal benefits. On the floor, the argument was made that we have the technological capacity to provide this degree of progress and it is going to cost x billions of dollars, and that if we don't do it, it will be the first time in the area of defense we have failed to take advantage of possibilities.

The Senate marched to that particular tune. But that tune needs to be changed to recognize what national security really means. You and I have heard our distinguished chairman talk about, not only national defense and the soundness of the dollar, but also the basic functioning of our society and its ability to meet the needs of the American people, as an essential aspect of security. Security means being able to walk at

night in Boston, or security from fear in terms of health, security for belief in a decent education and other factors. But to achieve this kind of security we must overcome the belief that if any weapons system is technologically possible, we have to spend the resources on it. We refuse either as a people or as political leaders to think hard and fast about what this really means and whether it does provide us with any additional security.

Also, the fact of the matter is that true, meaningful security is going to come when the other side is convinced that it also has substantial overall equality with us in terms of national defense. In a country that saw 20 million of its people killed in the last war, no political leader could survive unless he could tell his people that they had a national defense that was second to none. We also say we can't have a defense that is not second to none, so billions pour into defense on both sides when actually, with the vastness of the destructive ability of both sides, we are talking about differences that have lost their meaning. This gets back to the OTA study which shows that, even with a limited nuclear exchange, enormous devastation and death would result. The American people have to begin to understand this and demand of their political leaders some sensible, responsible, and courageous leadership in this area.

Senator CLARK. While we build, as you referred to it, the B-1 and Trident and MARV and MIRV, half the people in the world live on less than \$200 a year. We are facing enormous problems of poverty, food, population explosion, and we don't have the money in the Soviet Union or the United States to turn that around because we are spending some \$200 billion a year on armaments.

Two specific questions:

CONSEQUENCE ON DÉTENTE IF SALT II FAILS

If SALT II fails, what consequence do you think that will have on détente generally?

Would that in effect mean the collapse of détente as you see it?

Senator KENNEDY. I would say that preventing nuclear war and controlling arms is the most important aspect of détente. Détente generally has been overstated and oversold by some political leaders who gave the American people the sense that, as a result of the signing of various agreements, all differences between the Soviet Union and the United States would suddenly disappear and our difficulties in foreign policy were going to be ended.

I have always viewed détente in much more narrow terms. That there are limited areas of common interest between the United States and the Soviet Union in which mutual progress could be made, but that there are vast and broad areas in which agreement could not be reached.

Yet I really wonder at the memories of those people who question détente. You know, 13 years ago we were on the brink of nuclear war with the Cuban missile crisis; only a year before that we had the activation of some units of the National Guard, the building of the Berlin Wall, and other points of tension.

Certainly we are now better off in terms of the possibility of conflict which could come about through cold war confrontation with the

Soviet Union. That possibility has been moved back, maybe not as far as any of us would like, but it has been moved back. As a result of this moving back of the possibility of conflict, security for the American people to live in peace has been advanced; and the greatest contribution has been the progress made through agreements on strategic weapons. So I think it is the essential aspect of détente.

SUCCESSFUL SALT II'S MEANING TO QUANTITATIVE/QUALITATIVE
ARMS RACE

Senator CLARK. Last, you spoke about the quantitative arms race and that it might change into a qualitative race. I don't know whether you put it that way.

If SALT II indeed is successful and we go ahead with it, is it really going to mean much?

Aren't we in fact simply going to live up to the quantitative limitations and simply develop qualitative differences that will be equally significant?

Senator KENNEDY. Senator, this is why the resolution on Vladivostok, expressing the viewpoint of 42 Members of the Senate—Democrats and Republicans—is so important. It recognizes that SALT agreements on numbers are only a step toward really meaningful progress in the area of qualitative agreements, including the cruise missile and Backfire bomber and many other areas which are unsettling, including MIRV'ing by the Soviet Union.

I like to think that SALT II is not an end but rather an additional indication of the serious value that the American people place upon agreements. We should make our political leaders understand that we expect SALT II to be followed up in these other areas, so that we can make some meaningful steps in controlling this qualitative arms race as well.

Senator CLARK. Thank you.

Senator SYMINGTON. Thank you, Senator.

Senator Kennedy, I have one question but I would like to make a comment before asking it.

NECESSITY OF SOUND DOLLAR AND ECONOMY TO NATIONAL SECURITY

I mentioned the De Gaulle quote which, in effect, said what many of us believe, that you don't have to prepare to kill anyone 10 times. Once is enough. When you are dead you are dead.

The President has asked us to cut the budget \$28 billion. You might say he has demanded it. I think one of the reasons for that is he recognizes the economy is in bad shape—it is certainly deteriorating from the standpoint of debt.

The Secretary of the Treasury the other day stated that the annual deficit would be, as I remember the figures, considerably higher than before, perhaps as high as \$90 billion, and it is now estimated around \$70 billion to \$80 billion.

We have the problems of New York City, and we know of other cities, and that the problem of the inner cities is a national problem. You as much as any Member of the Senate know of those problems.

At the same time that this request to cut the budget is announced, the Secretary of Defense, criticized as "savage" the reductions made by the House Appropriations Committee in the defense budget.

My question to you, sir, would be do you not believe that a sound dollar and sound economy is as vital to true national security as the latest weapon system?

Senator KENNEDY. I do. I learned that from my chairman here listening to you for many years on this subject.

Senator SYMINGTON. Do you think our system can continue indefinitely with an annual deficit running that high?

Senator KENNEDY. Very definitely not, Mr. Chairman. As you well know, we are facing a \$70 billion deficit now. For every percentage point of unemployment over 4 percent, the deficit goes up by about \$16 billion. So by going from 8½ percent unemployment to 4 percent unemployment, we could eliminate the deficit entirely and balance the budget. The real waste today is the underutilization of plant capacity, the wasted skills of American workers that are lost because of unemployment. So I think the real challenge is to reverse those trends in the economy, and that can be done through a variety of measures.

I am for extension of the tax cut. I think it should probably be extended at the level of \$17 billion rather than the \$28 billion the President has proposed.

I also think the Budget Committee has done a superb job trying to identify areas where the budget can be cut. Yet, the President's proposal for an arbitrary ceiling ignores the progress we have made.

As you well understand, the administration program is to provide a \$28 billion tax incentive this year and budget cuts of \$28 billion next year, but this could be an economic disaster. It would overheat the economy before the 1976 election and pull the rug out after election day. It was basically a political program, and I think all of us can understand the reasons the administration is trying to push it, given the current problems.

As you understand, in cutting a budget of \$370 billion, close to two-thirds is in noncontrollable items—the President says we can control them, but we are talking about social security, medicare, veterans benefits, retirement benefits, and payment on the debt. Of the remaining third, close to two-thirds is defense. All the President has left is basic social programs in areas like health and education. Poor people are paying a large part of their budget for two items, food and fuel, and now the administration is cutting back on other services they receive. It seems to me that we are putting too great a burden on a particular group or class of people if they have to bear the full brunt of major budget cuts. I agree with you that there must be a restoration of the health of the economy. We must, of course, have the defense and security essential to meet our Nation's needs, but we must also recognize that any definition of security must also take account of the way government meets the needs of all American people.

Senator SYMINGTON. A well-known southern Member of Congress said to me last week that, if the truth were out, the actual position of the Federal Government would be shown to be considerably worse than the State of New York. The only difference between the State of New York and the Federal Government is that the Federal Government has printing presses.

Senator CASE. And has nowhere else to go.

Senator SYMINGTON. Would you care to comment on that?

Senator KENNEDY. It seems to me—and you would understand this better because you have been longer in American political life—at other times we faced serious economic adversity where bold leadership was able to bring the country back to a period of economic prosperity and stability. That is not an impossible dream. It will take more effective leadership than we have at the current time.

Senator CASE. I ought to get this back to arms control.

Senator SYMINGTON. I think this is part of it—where are you going to put your money?

Senator CASE. I understand completely the temptation.

Senator SYMINGTON. I didn't mention New Jersey or Missouri.

Senator CASE. May I ask a couple of questions?

Senator SYMINGTON. Yes.

POSSIBILITY OF LIMITING U.S. WEAPONS DEVELOPMENT

Senator CASE. First, I will ask that an article by Leslie H. Gelb in the New York Times on the 19th of this month be placed in the record, entitled "The Changing Estimates of Nuclear Horror."

[The information referred to follows:]

[From the New York Times, Oct. 19, 1975]

THE CHANGING ESTIMATES OF NUCLEAR HORROR

(By Leslie H. Gelb¹)

WASHINGTON—A Senate committee announced last month that the Pentagon had changed its estimate of how many Americans would be killed if the Soviet Union launched a limited nuclear attack against United States nuclear missiles—from a maximum of three million to a maximum of 22 million. These calculations could be dismissed as simply another exercise in the macabre and the fantastic, but this time, the numbers mean something.

They have to do with Defense Secretary Schlesinger's belief that a limited nuclear war is not only thinkable, but that the United States needs the capability to fight one. The price tag for this capability is over \$100-million this year and billions in the future, according to Senator Thomas McIntyre, Democrat of New Hampshire, and an expert on those matters. Disclosure of the numbers also tells how Congress is learning to compete with the Pentagon in the production of "facts." But despite the new numbers, when Congress comes to vote, slogans still are likely to count more than facts.

Last fall, Mr. Schlesinger appeared in closed session before the Subcommittee on Arms Control of the Senate Foreign Relations Committee. He was defending his counterforce doctrine. This holds that Moscow is developing the capability to fight something less than an all-out nuclear war, and that the United States needs a similar capability. This would mean developing missiles with sufficient accuracy and explosive power to destroy Soviet missiles in their silos without hitting civilian population centers.

Senator Clifford P. Case, Republican of New Jersey, clearly stated the issue: "Should it turn out that the destruction to our society would be so substantial [from this limited nuclear war] as to make this cost as unacceptable as all-out attacks specifically targeted against our population centers, then the rationale for the multibillion-dollar family of weapons designed to destroy military targets . . . could be called into serious question."

Mr. Schlesinger's answer in part was this: "The likelihood of limited nuclear attacks cannot be challenged on the assumption that massive civilian fatalities and injuries would result." To support this, he produced a study showing that a Soviet attack against America intercontinental ballistic missile bases would result in fatalities ranging between 800,000 and 3 million.

¹ Leslie H. Gelb is a diplomatic correspondent for the New York Times.

SUMMONING THE EXPERTS

Mr. Case and Senator Stuart Symington, Democrat of Missouri, and the man soon to become the chairman of this subcommittee, did not accept these calculations. They turned to the recently established Congressional Office of Technology Assessment to provide a critical analysis. The office, in turn, convened a group of former Pentagon experts to review the estimates.

Some months later, this panel concluded that the Pentagon's casualty figures "were substantially too low," and that the military's calculation did not reflect "the large uncertainties" of any kind of nuclear war.

With new assumptions provided by the panel, the Pentagon redid its study. The Pentagon now estimated the fatalities as between 3.5 and 22 million, with 6.7 million as "the most representative" case. Mr. Symington made the new study public.

Mr. Schlesinger has often said that he would prefer neither side to develop counterforce capabilities. The clear implication is, however, that if these weapons are to be developed that the fatalities projected by the Pentagon would be an acceptable risk when compared with all-out nuclear war.

Mr. Case praised Mr. Schlesinger for his forthrightness, then struck home. The Pentagon, he said, "first proclaimed this counterforce doctrine, and only after the fact began to consider in detail what the nonmilitary consequences might be to this country." What Mr. Case did not say was that the Senate had all of this new information available to it last summer when it approved a package of new nuclear counterforce programs costing \$109.7 million.

This is what happened. Senator McIntyre presented an amendment to cancel research and development programs on these new weapons. As a key member of the Senate Armed Services Committee, he had already been given a copy of the new Pentagon estimates on fatalities. He believed that sharing the new results with his colleagues would bring them around to his view.

Since the Pentagon had stamped the new study secret, he called for an unusual secret session of the Senate. The session turned into a contest of secrets. To counter Mr. McIntyre's secret on fatalities, Senator Henry M. Jackson, Democrat of Washington, produced secrets about new Soviet counterforce programs.

The debate continued in an open session.

Out came the pro slogans on the amendment: A nuclear bomb dropped on the White House will kill us here on Capitol Hill; if we build these new weapons, the Russians will follow suit; to develop counterforce weapons will somehow legitimize their use.

Out came the con slogans: Any good hunter knows you need an accurate gun; we need the new programs as bargaining chips in the nuclear arms talks with Moscow; politically and militarily, the United States should never be second best.

The amendment was defeated, 52 to 42. It will be offered again next year, and thanks to the Senate committee, all the essential "facts" will be in the public domain. At that time the amendment might well succeed but it has always to be remembered that the Congress has never forced the Pentagon to cancel a major weapons system program.

Senator CASE. You are probably generally familiar with the article.

He points out a little pessimistically that we had developed most of the information in our technology assessment work last year at the time the Senate was considering the appropriations bill. Senator McIntyre presented an amendment to cancel research and development programs on the new weapons. We had, as my colleagues know, the secret session. After that the debate continued in open session and the amendment lost 52 to 42.

That to my mind wasn't as bad as it might have been and I don't think it means that if we keep at this effort, we aren't going to succeed in the future.

I wonder if you have any comments on that?

Senator KENNEDY. I agree with you, Senator. I think there is a broad desire among the American people for real restraint in this area. The arguments for restraint are responded to demagogically

without really permitting the American people to understand the full importance of the issues; but if we are permitted an opportunity and the national leadership, I am absolutely convinced that we can support a responsible policy which will make an extraordinary contribution to the world community. We have seen this with the 42 co-sponsors of the Vladivostok Resolution and in other votes.

ROLE OF CRUISE MISSILE

Senator CASE. I have one other question based also on another article in the Times by John Finney, also on October 19, which I ask be included in the record at this point.

[The information referred to follows:]

[From the New York Times, Oct. 19, 1975]

SCHLESINGER SEES NEW MISSILE ROLE

Pentagon's Chief Promoting Nonnuclear Use of Cruise Weapon, in Development

(By John W. Finney)

WASHINGTON, Oct. 18.—Defense Secretary James R. Schlesinger is promoting a new, nonnuclear role for the cruise missile, a projected weapon that in its nuclear role has become a controversial issue in the strategic arms limitation talks with the Soviet Union.

Mr. Schlesinger is suggesting, still only privately thus far, that the long-range cruise missile, used as a replacement for the manned fighter-bomber, is potentially the most interesting, exciting weapons advance of the decade.

Before a private gathering in London recently, for example, Mr. Schlesinger said that he foresaw the cruise missile, armed with a conventional warhead, as "altering our weapons strategy" and as having "extraordinary" promise as a defensive weapon against the Soviet fleets on the northern and southern flanks of Europe.

For Mr. Schlesinger, the conventional role for the cruise missile represents a significant shift in his rationale for the weapon, which is basically a pilotless, jet-powered plane which can deliver a warhead with great precision over long ranges.

One indirect effect of his justification of the cruise missile as a conventional weapon is to introduce new complications in the efforts to control the missile as a strategic weapon.

MISSILE IN DEVELOPMENT

Until recently, Mr. Schlesinger emphasized only a strategic role for the cruise missile, which is now in an advanced stage of development by the Navy and the Air Force. In testimony to Congress this year, the Defense Secretary foresaw the cruise missile assisting strategic bombers in penetrating the Soviet Union's air defenses and augmenting the strategic capabilities of missile-launching submarines.

In contrast, in a recent private appearance before the International Institute of Strategic Studies in London, Mr. Schlesinger suggested that "the most important role" for cruise missiles may be as "land-based, conventional weapons" for attacking Soviet shipping and targets in Central Europe.

For example, he said, the cruise missiles could "provide an extraordinary edge on the flanks" of the North Atlantic Treaty Organization. Stationed in Norway against the Soviet North Sea Fleet or in Turkey against the Black Sea Fleet, he said, cruise missiles "could make the cost of action very high to the Soviets."

Similarly, he said, on the central front in Europe, cruise missiles could help overcome some of the vulnerability problems confronting NATO fighter-bombers as the Russians build up their air defenses as well as their ability to strike airfields in Western Europe.

Mr. Schlesinger said it would be possible to accept some limitations on cruise missiles in their strategic role as long as "we can continue development" of the weapon for a conventional mission.

The clear and intended implication of his remarks was that in any strategic arms limitation agreement with the Soviet Union, the United States should not accept any limitation on cruise missiles that would impede their development and deployment as conventional weapons.

As Mr. Schlesinger acknowledges, this raises the difficult technical problem in any arms control agreement of distinguishing between strategic and conventional cruise missiles.

MISSILE RANGE A KEY ISSUE

One possible distinction is in terms of the range of the cruise missiles. For the conventional role, Mr. Schlesinger is thinking in terms of a missile with about a 500-mile range. With such a range, the missile presumably would have little strategic capability for attacking the Soviet Union.

The inherent difficulty with such a distinction, however, is that by reducing the bomb payload, which is possible by replacing a conventional bomb with a nuclear warhead, and increasing the fuel load, it is relatively easy to extend the range of a cruise missile four or five times. Thus, in any arms control agreement, neither side could have any assurance that a conventional cruise missile could not be converted into a strategic weapon.

Even before Mr. Schlesinger began raising the conventional role for the cruise missile, the weapon had developed into one of the principle obstacles, along with the Soviet Union's new Backfire bomber to a new agreement limiting strategic weapons.

Basically, the Soviet Union is taking the position that long-range cruise missiles should come within the over-all limitation of 2,400 "strategic delivery vehicles" for each side set in the 1974 Vladivostok agreement between President Ford and the Soviet Communist Leader Leonid I. Brezhnev. The United States is insisting the limitation should not generally apply to cruise missiles it has under development.

Senator CASE. That article deals with Schlesinger's view as to the cruise missile. He says he sees in this new missile a new role, namely, its usefulness as a nonstrategic or conventional weapon and adding exciting possibilities to our ability to defend, for instance, NATO territory by conventional weapons as opposed to early resort to strategic weapons.

I wonder if you have any comments on that?

Senator KENNEDY. Well, I am familiar with the Secretary's view, that the cruise missile could provide for a standoff capability, and that it is an effective weapon system. But, as you well understand, the cruise missile is virtually impossible to verify, and it would add an unsettling dimension to any SALT agreement. It seems clear to me, as I mentioned earlier, if we could get an agreement that would balance the cruise missile and the Backfire, however, that should be the first order of priorities; if not, it seems to me we ought to go for a moratorium on development until we can finish this version of SALT and can get some other negotiations to work out agreements in these other areas. That is what I would favor. But the escalation of the arms race represented by that weapon system, adding that into the mix of problems at SALT, will add a dimension which will make it extremely difficult to achieve meaningful agreement.

So I hope that we would have an agreement on both the cruise missile and the Backfire bomber; if not, then a moratorium on the cruise missile until we can deal with it in follow-up negotiations.

Senator CASE. I don't want to get into too much detail, but it has been suggested perhaps we might consider an agreement which limited the use of cruise missiles to airplanes and eliminated them from use as surface-to-surface missiles.

Senator KENNEDY. As I understand it, B-52's, F-111's, B-1's and 747's would all be capable of launching them, so you are really not stepping down very far in the arms race.

Senator CASE. No; I don't think you are.

People argue that if you do this, you don't have to have the B-1. You can use the old planes.

Senator KENNEDY. That is right. I made that argument myself in opposition to the B-1 when it was coming up, but we made the decision to move the B-1.

Senator CASE. Thank you.

Senator SYMINGTON. Thank you, Senator.

I would like to make this observation on my own.

COMPARATIVE IMPORTANCE OF CRUISE MISSILE AND BACKFIRE

In my opinion, the cruise missile could be launched from sea, from any type of ship, submarines, from the air or any other type of launching platform. I think you mentioned the 747—and you could also have C5A's, and so forth. So that you just throw the whole concept of any meaningful arms control out of whack.

As far as the Backfire goes, I think it is much less important.

For example, we have the FB-111, and so far as we know there is not too much difference between the two planes, especially when you consider the fact that we have many FB-111's located in Europe. We also have an excellent capacity for refueling, much more than any other country.

I would hope that we would really try hard to reach some agreement on the cruise missile because, speaking for myself, I don't see how we can have a meaningful arms agreement if both countries go ahead with it.

FUTURE HEARING

Before we recess or adjourn the hearings I would like to mention that this Friday at 10 o'clock the subcommittee will hear from the Hon. Robert Ellsworth, Assistant Secretary of Defense for International Security Affairs. The testimony will concern the Nation's defense strategy against a background of nuclear proliferation. Additional countries that develop nuclear weapons through proliferation of nuclear power reactors and other nuclear facilities in the world could have a profound effect on this nation's defense policies. The testimony comes against the background of this committee's findings that within the next decade up to 30 more nations will have the capability to build nuclear arsenals. That hearing will be this Friday morning.

Senator, do you have something further?

Senator CASE. No; thank you.

SOVIET RESPONSIBILITY TO USE RESTRAINT

Senator KENNEDY. I would just like to make one point, Mr. Chairman, that perhaps was not stressed as strongly as it could have been. To be sure, there is an important obligation of our civilian political leaders to exercise important judgments in these matters and to spell out clearly our vital national interests.

But there is also an important responsibility on the part of the Soviet Union to exercise restraint. When I visited the Institute of the U.S.A. in the Soviet Union, I tried to make the point that they could make a very substantial advance toward the cause of understanding with the

United States if they would make their intentions known in strategic arms. So often we operate in the dark concerning the intentions of Soviet defense policy. They bear an important responsibility to make their intentions known, to proceed with great caution in the deployment of their larger missiles and Backfire bombers. Those of us who are involved in trying to bring a sensible and responsible defense policy to the United States have every right to expect that there will be corresponding action on the other side. There is a strong burden on Soviet leaders, just as there is on ours, for it is the people of both countries who will benefit from the courageous leadership. We should not be alone in attempting to exercise that leadership, in attempting to reach some agreement; but leaders on the other side should also be expected to provide it, as well.

Senator SYMINGTON. With that I certainly agree and I am confident no member of this committee has any idea or desire to have a unilateral disarmament. We are attempting to work this out on the basis that any country in the world knows if it attacks the United States it is automatically committing suicide. I think that is the basis of all of the thinking in this field.

There has never been any thought in the mind of the distinguished Senator from New Jersey or myself that we have unilateral disarmament. We are engaged in an effort to place proper priorities on our limited resources—to achieve as much return as possible for our non-defense as well as our defense programs.

Do you agree on that?

Senator KENNEDY. I agree with you.

Senator SYMINGTON. Thank you very much.

Senator KENNEDY. Thank you very much.

[Whereupon, at 3:50 p.m., the subcommittee adjourned to reconvene at 10 a.m., on Friday, October 24, 1975.]

NON-PROLIFERATION ISSUES

FRIDAY, OCTOBER 24, 1975

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington and Case.

Senator SYMINGTON. The hearing will come to order.

Mr. ELLSWORTH. I would like to introduce Dr. Joe Landauer who is accompanying me this morning.

Senator SYMINGTON. Dr. Landauer, how are you?

OPENING STATEMENT

This morning the Subcommittee on Arms Control, International Organizations and Security Agreements continues its investigation of nuclear proliferation issues. We are glad to have with us this morning as our witness Hon. Robert Ellsworth, Assistant Secretary of Defense for International Security Affairs.

In past sessions this year the subcommittee has examined trends in nuclear proliferation, the adequacy of international controls and safeguards, and possible further steps which might help in limiting some of the potential dangers of the proliferation which is now occurring.

Frankly, our findings have been somewhat discouraging. Present international safeguards against diversion of nuclear materials from peaceful power programs to military purposes would appear virtually useless.

The Non-Proliferation Treaty itself may be of more value to a determined violator than to a nation which wishes to be responsible in its nuclear programs.

Few realize that any nation desiring to develop nuclear weapons, can get out of the Non-Proliferation Treaty within 90 days; this would be after having taken advantage of that treaty to gain the nuclear materials and expertise required for weapons development.

As a member of the Joint Committee on Atomic Energy, I can say this recent deal between Germany and Brazil in which Germany will sell Brazil the equipment and technology for its own full nuclear fuel cycle, demonstrates that the wherewithal to make a bomb is available through regular commercial channels.

So far the nuclear supplier nations—meeting in semi-secrecy in London—have not been able to reach any agreement whatever on controlling the sale of nuclear weapons-making technology.

There are few real obstacles in the way of any nation, with money, or oil, for example, which wishes to develop nuclear arms.

At this point I think there are at least two members of the nuclear club, perhaps three, which may be only too happy to make some form of a deal for oil while merchandizing plutonium.

The hearing this morning draws upon what we have learned and looks ahead to the question of what this anticipated nuclear proliferation will mean in terms of national security.

Widespread possession of nuclear weapons would clearly pose a considerable threat to the United States and its forces overseas.

New possessors of nuclear weapons could threaten any of the 42 nations currently bound to the United States by collective defense treaties. These nations are joined to us by pacts which declare, in essence, that an attack on one is an attack on all. In most, if not all, cases we are pledged to respond to an attack in accordance with our constitutional practices.

In the new nuclear world, it will no longer be possible for any two countries to decide nuclear matters for others. Dr. Oppenheimer described the situation as two scorpions in a bottle long before there were as many scorpions in the bottle as we have. What's more, there may be many more in the future the way things are going.

Any country that possesses nuclear weapons could present a grave threat to virtually any other country.

The new nuclear world threatens both insecurity and instability. We must face this issue now if we wish to have any hope of preservation of our own national security.

Secretary Ellsworth is here this morning to give the Defense Department's perspective on this matter.

Mr. Secretary, we welcome you. You have had a very distinguished career in Congress, as Ambassador to NATO, and now as Assistant Secretary in the Defense Department. I understand you have a prepared statement. Would you read it?

STATEMENT OF ROBERT ELLSWORTH, ASSISTANT SECRETARY OF DEFENSE, INTERNATIONAL SECURITY AFFAIRS, DEPARTMENT OF DEFENSE; ACCOMPANIED BY DR. JOSEPH LANDAUER, SPECIAL ASSISTANT TO THE DEPUTY ASSISTANT SECRETARY OF DEFENSE

Mr. ELLSWORTH. Yes, sir. I would be glad to if that is the chairman's wish.

Mr. Chairman, I am pleased to have the opportunity to appear before this distinguished committee to present the view of the Department of Defense on the security implications for the United States of further nuclear proliferation. In my remarks, I will emphasize the defense-related issues associated with proliferation.

PROBLEM OF FURTHER NUCLEAR PROLIFERATION

As the world turns more and more to nuclear energy as an additional source for electric power, the vast amounts of nuclear materials and technology involved will increase the likelihood of further weap-

ons proliferation. The sobering prospect of a further proliferated world is of great concern to the Department of Defense which is charged with the responsibility of insuring our national security. The impact on U.S. security depends upon both where and when nuclear proliferation occurs. As I shall point out later, the problem of proliferation will require both constructive means to deter nuclear weapons acquisition and comprehensive planning to adjust our country's defense in the eventuality of further proliferation.

The Department of Defense is actively engaged in our Government's interagency efforts which deal with nuclear proliferation. My Office of International Security Affairs works on behalf of the Department of Defense very closely with the Arms Control and Disarmament Agency, Energy Research and Development Administration, the Department of State, and the National Security Council staff to formulate and implement U.S. policy on this matter of vital national concern.

The Department of Defense opposes further proliferation of nuclear weapons since their acquisition by additional countries would adversely affect our national security. There are several reasons for this: An increase in the number of nuclear weapons states would upset the international stability essential for world peace. The emergence of new nuclear states with fragile political, social, military, and economic systems would pose a new threat to an already precarious world order.

Nuclear proliferation also increases the likelihood that localized nonnuclear conflicts involving lesser nuclear powers could escalate and breach the nuclear threshold. Although regional nuclear wars would be disastrous for all the participants there would also be the ever-present danger that the United States and/or the Soviet Union could be drawn into such a regional conflict and thus evolve into a confrontation between the two nuclear superpowers.

As the family of nuclear nations continues to grow, some of them could be expected to pose a direct threat to our national security. Deterrence of this increased and diffused nuclear threat and the associated danger of accidental or catalytic nuclear war could well create requirements for increased defense expenditures.

Another aspect of nuclear proliferation that would impact on U.S. national security is the increased threat of nuclear terrorism or outlawry. With larger numbers of nuclear weapons and amounts of nuclear materials in storage or in transit around the world, there would be increased opportunities for terrorists and other outlaw groups to obtain access to nuclear weapons or to the materials required to build them. It is possible that other countries might not guard their nuclear stockpiles as well as the U.S. nuclear stockpiles are protected, thus multiplying the opportunities for diversion of nuclear materials. No nation would be immune to nuclear blackmail if a nuclear explosive device or its essential elements fell into the wrong hands.

Any nuclear proliferation would be inimical to U.S. security interests. The severity of the security implications however would vary depending upon the country's political, social, military, economic, and ideological orientation, and its place in the international community. For example, proliferation by a country with limited resources, a record of governmental instability, and situated in a region with an-

tagonistic neighbors would have more serious implications for the United States than would proliferation by an industrial power who is also a historic ally. The DOD would need to consider the specific nature of the threat to U.S. security that a particular act of proliferation would engender. Certainly, the capability to directly threaten the United States would depend on a proliferating country's economic and technical resources and, therefore, the size and sophistication of its potential weapons stockpile, as well as what delivery systems it has now and is likely to obtain. In any case, there can be no net security advantage to the United States from proliferation by any other country.

Both capability and motivation are required for a country to "go nuclear." Capabilities can be assessed far more accurately than motivations or intentions. Intentions will be influenced by a near-nuclear nation's perception of its own security position. The U.S. efforts to assure that its nonnuclear allies and friends do not perceive themselves threatened can have a large role in persuading these countries not to develop their own nuclear weapon capability.

DOD'S ROLE IN IMPLEMENTING U.S. NONPROLIFERATION POLICY

Probably the Department of Defense's major role in implementing the U.S. Government's nonproliferation policy is that of influencing the security perceptions of our nonnuclear friends and allies. A nation that has the capability to produce nuclear weapons may be dissuaded from that act by perceiving that its own security is not in jeopardy. Hence, alliance with, and confidence in, the United States may be decisive for some nations who otherwise consider the possibility of going nuclear. In Northeast Asia or NATO Europe, for example, regional stability is particularly critical. U.S. security assurances to our friends and allies in these regions have been influential in meeting their perceived security requirements. These efforts, which include conventional force deployments, security assistance, and nuclear guarantees, have contributed to regional stability and have provided strong incentives not to acquire nuclear weapons. It is noteworthy that, with the exception of the United Kingdom and France, none of the industrial nations which have the greatest capability for developing their own nuclear weapons have chosen to do so. We believe that U.S. security commitments and assistance have provided a secure climate in which these nations have been able to make their decision not to proliferate.

In addition, the DOD cooperates and participates in U.S. inter-agency efforts along with some efforts of its own in support of U.S. nonproliferation objectives along the following lines, for example:

The U.S. Government supports and advocates strengthening of the Non-Proliferation Treaty. In the final declaration of the recent Non-Proliferation Review Conference, the parties to the treaty stressed the importance of extending the application of safeguards to all peaceful nuclear activities of importing states, particularly those not parties to the treaty. Efforts directed toward implementation of this idea are under way.

Strengthening the International Atomic Energy Agency—IAEA—and its safeguarding activities will also help inhibit further nuclear proliferation by creating a climate of security and trust.

To further restrain nuclear proliferation, the U.S. Government is encouraging the formation of multinational regional nuclear fuel centers in preference to less economic and less secure national nuclear fuel facilities.

Nuclear proliferation may be deterred by the inhibition of the development of PNE's—peaceful nuclear explosives—by nonnuclear weapon states. It is clear that a nuclear weapon capability would result from the development of peaceful nuclear explosives by an otherwise non-nuclear state. For this reason, our Government has tried to discourage such indigenous development.

Strengthening the physical security of nuclear materials and facilities will limit opportunities for diversion. We have continued to improve the security of DOD weapon storage sites here and abroad as well as to keep cognizant of similar programs to augment the security of civil nuclear facilities. Department of Defense resources would be available for recovery operations in the event of theft or sabotage of our nuclear weapons.

And efforts are continuing to combat international terrorism. The working group of the Cabinet Committee To Combat Terrorism and other interdepartmental bodies are addressing this problem.

Although most of these antiproliferation actions are predominantly staffed and directed by other Government agencies, DOD is actively involved in their day-to-day work. Taken individually, each of these actions might not seem to provide a strong deterrent to proliferation. Altogether, however, these actions have been quite effective, so far. We can continue to expect them to serve as a framework for our nonproliferation objectives.

INDEPENDENT DOD EFFORTS

In addition, the DOD has several independent efforts now under way which will contribute to the overall U.S. Government nonproliferation scheme. These programs involve research on the likelihood of certain near nuclear countries attempting to develop nuclear weapons, examination of measures to inhibit such development, and methods for coping with further proliferation if it were to occur.

High level Defense Department interest continues with the involvement of senior personnel in bilateral and multilateral efforts to manage the problem of proliferation. The Secretary of Defense himself, Dr. Schlesinger, has been personally involved in supporting administration efforts to constrain further proliferation. His personal interest and knowledge in this matter dates back to his association with Rand Corp., where he headed a major research program on the subject in the 1960's.

CONCLUSION

In conclusion, further nuclear proliferation would have serious security implications for the United States. In addition to the destabilizing effects on the international regime, proliferation would complicate providing for the national defense, could contribute toward greater possibilities of U.S. involvement in nuclear war, and would provide additional opportunities for terrorism. The DOD is acting to inhibit potential proliferation. However, our best efforts may not

prevent certain countries who are bent on acquiring nuclear weapons from actually doing so. The Department of Defense will be prepared to respond adequately to any such threats to our security.

Mr. Chairman, this concludes my formal remarks. I would be pleased to continue the discussion of these issues with you.

Senator SYMINGTON. Thank you very much, Mr. Secretary. I think it is an interesting and constructive statement. You have changed it slightly from the copy submitted yesterday, but I think I can follow that.

WHERE AND WHEN NUCLEAR PROLIFERATION WILL OCCUR

You say the impact on U.S. security depends on both where and when nuclear proliferation occurs. Is it not a fair statement that it will occur, as things are now going, in all parts of the globe?

Mr. ELLSWORTH. Well, as things are now going it may occur in all parts of the globe. But I think it is a bit early to be able to specify where or when.

Senator SYMINGTON. Would you name one part of the globe where it has not occurred?

Mr. ELLSWORTH. Well, speaking from the standpoint of the Department of Defense, and focusing on weapons, it has not occurred beyond the United Kingdom and France in Europe.

Senator SYMINGTON. I did not ask you how many countries in Europe, I just asked in what part of the globe is there no proliferation. India has had an explosion; China has a growing nuclear arsenal; other countries have the technology. That was the thrust of my question.

Mr. ELLSWORTH. Well, Senator, our concern is with weapons proliferation, and we feel it is important to realize there are a number of steps between the acquisition of nuclear power technology very expensive and difficult steps between the acquisition of nuclear power technology on the one hand and on the other hand the acquisition of nuclear weapons.

Senator SYMINGTON. I would agree with that. But I think we have to be realistic. Of course, the ideal way to deliver a nuclear weapon, I suppose, is with a missile, submarine, or an aircraft. However, you yourself could carry a bomb with the yield of the Hiroshima bomb into this room in a suitcase. The latest figure I have on casualties from the Hiroshima bomb is 85,000 dead. So, when you can produce the capacity to destroy 85,000 people with one suitcase you have a situation that's almost beyond belief.

You probably read that the head of the Libyan Government said the other day, that in 3 or 4 years Libya would be a nuclear power. And, as you know, Libya is not a country known for its friendliness toward us.

DOD ACTIONS TO OPPOSE PROLIFERATION

At the top of the next page, you state the Department of Defense opposes further proliferation of nuclear weapons since their acquisition by additional countries would adversely affect our national security. I would agree with that. I was wondering what specific actions have you taken to oppose the proliferation.

Mr. ELLSWORTH. Well, Senator, a specific action to oppose prolifer-

eration is to stress with our nonnuclear friends and allies that their own national security does not require them to go nuclear. And to stress our Government's policy that it is undesirable for them to go nuclear.

As my statement indicates, a number of advanced industrial countries that clearly have the ability to go nuclear, but who do not see their security interests needing that, have abstained. That is the main specific thing we have done to prevent countries from going nuclear.

In addition to that, we are working with other agencies of the Government in a whole variety of ways to increase security and to diminish the chances of diversion and the opportunities for development of weapons technology.

Senator SYMINGTON. For the record would you give us a list of these specific varieties of ways?

Mr. ELLSWORTH. Yes, sir.

Senator SYMINGTON. And if any of it is classified, you may submit it as such.

Mr. ELLSWORTH. Yes, sir.

[The information referred to follows:]

DOD EFFORTS CONCERNING NUCLEAR NONPROLIFERATION

[Supplied by Department of Defense]

The Department of Defense is involved in the United States Government interagency efforts to increase the physical security of nuclear materials and technology to reduce the opportunities for diversion and development of nuclear weapons technology by non-nuclear weapons states. These include improving physical security and safeguarding of special nuclear materials, upgrading physical security of nuclear weapons storage and transportation, advocacy of adoption of certain minimum safeguard standards for exports of nuclear materials and technology by supplier states, supporting and strengthening IAEA procedures and agreements to preclude diversion of nuclear materials for weapons developments. Several independent non-governmental research projects concerning non-proliferation are sponsored by the Department of Defense. This research to examine the possibility of future proliferation in various regions of the world enables the Department of Defense to develop contingency plans to cope with these future developments if and when they occur. Additionally, at each session of the United Nations Conference of the Committee on Disarmament the Department of Defense has a representative on the United States delegation headed by the Arms Control and Disarmament Agency.

INCREASED DEFENSE EXPENDITURES IN RESPONSE TO POSSIBLE PROLIFERATION

Senator SYMINGTON. In your statement you say deterrents to the increased and diffused nuclear threat and the associated danger of accidental or catalytic nuclear war could well create increased requirements and increased defense expenditures. What kind of increased defense expenditures are you talking about?

Mr. ELLSWORTH. Well, in response to possible proliferation, requests have been made for and congressional appropriations have been increased for expenditures relating to improvements in the security of nuclear sites.

Senator SYMINGTON. I'm sorry. I did not hear.

Mr. ELLSWORTH. Requests for congressional appropriation for increased funds for improved security of nuclear weapons' sites have been made.

Senator SYMINGTON. You do not mean increased security against the Soviet Union, do you? We must already be protecting ourselves against that.

Mr. ELLSWORTH. No. I was referring to appropriations to increase the security of our own nuclear weapons storage sites, Senator, as one way in which we have asked for and received increased expenditures in order to guard against terrorism which might be associated with proliferation.

Senator SYMINGTON. When you say diffused nuclear threat, I was wondering what additional funds would be needed because of additional proliferation. By diffused nuclear threat, I assume you mean further nuclear proliferation by more nations.

Mr. ELLSWORTH. Should there be the actual acquisition of nuclear weapons by an advanced industrial state that could have the capability of equipping itself with delivery systems that would directly endanger the United States, then it seems to me that we in the Defense Department would have to be prepared to ask the Congress for increased appropriations for appropriate defenses. Clearly such proliferation would give pause to continuing along at our present level of military deployments. New deployments would require increased expenditures. That is an example of what I said earlier about the nature of this threat depending when and where nuclear weapons proliferation actually occurred.

Senator SYMINGTON. Thank you.

CREDIBLE DETERRENT

In a recent biography of General de Gaulle by a well-known Australian historian, Brian Crozier, General Eisenhower asked General de Gaulle in 1959 how he could hope to achieve the same level of nuclear armament as the Soviet Union. According to the author, General de Gaulle replied, in the doctrine of the French deterrent in its simplest and truest form. "You know very well that on the scale of megatons a few rounds of bombs could destroy any country. For our deterrent to be effective, all we need is enough to kill the enemy once even if he has the means to kill us 10 times over".

Would you not agree that any country that began to develop only a few nuclear weapons could have a credible deterrent against any of its less powerful neighbors and perhaps even pose a threat against some larger nuclear weapons nations?

Mr. ELLSWORTH. Yes.

Senator SYMINGTON. Thank you.

MODIFICATION OF CONCEPT OF STRATEGIC DEFENSE

I have it on the best authority that the Soviets thought 9 years ago that there was nothing we could do to prevent them from destroying us, and there was nothing they could do to prevent us from destroying them. I would think on that premise we would modify our concept of strategic defense of the United States. Yet it would appear that the military are prone to follow tradition as against modernity—especially if they have won the previous war—and I know of no major changes that we have made except to ask for more nuclear weapons and more conventional weapons.

Mr. ELLSWORTH. Sir, to make a point on that——

Senator SYMINGTON. Yes; please do.

Mr. ELLSWORTH. I believe the record shows at the present time we have a considerably smaller number of deliverable nuclear warheads than we had at the peak. I think from 1955 to 1965 the number of our nuclear warheads decreased. From 1965 to 1975 they also decreased again, so that with regard to the proposition that our military posture has not been changed, but has simply increased the number of nuclear warheads, that is subject to some question.

Senator SYMINGTON. If true, do you imply that this was done on the basis of unilateral disarmament?

Mr. ELLSWORTH. It was not done on the basis of unilateral disarmament, but on the basis of changed and modernized military requirements based on advances in technology.

Senator SYMINGTON. Secretary McNamara testified before this committee that we have some 7,000 warheads in Europe. Are you implying we now have less than 7,000 in Europe?

Mr. ELLSWORTH. No; I was speaking about the overall inventory of nuclear warheads in the hands of the U.S. military.

Senator SYMINGTON. We never exploded the hydrogen bomb until the 1950's. Since this is so, aren't we talking about building a large stockpile of larger yield hydrogen weapons as well as the fission bombs we had during that period? Didn't our total stockpile of warheads increase?

Mr. ELLSWORTH. Not exactly. The picture also involves a number of changes in delivery means, changes in accuracy, and also changes in the types of weapons deployed.

[The following information was subsequently supplied:]

SIZE OF U.S. STRATEGIC STOCKPILE

[Supplied by Department of Defense]

Although our strategic defensive warheads have declined significantly during the period between 1965 and 1975, there was an increase in the strategic offensive stockpile. The trend in total number of nuclear warheads is continuing downward since it peaked out in the mid-1960's. Likewise, the numbers of delivery vehicles and megatonnage continue to decline. The point I intended to make and wish to emphasize is that the United States is not engaged in an upward spiral of increasing our nuclear arsenal but rather making considerable quantitative reductions while striving for qualitative improvements.

Senator CASE. Would the Senator yield for a question to clarify?

Senator SYMINGTON. Yes; just one more thing.

Would you supply for the record—classified if you think it proper—justification for saying that we have a great many less warheads today than we had before?

Mr. ELLSWORTH. Yes, sir.

Senator SYMINGTON. And if you would divide that between strategic warheads and tactical warheads.

Senator CASE. That is the point I wanted to make, Mr. Chairman.

Senator SYMINGTON. I yield to the Senator.

Senator CASE. I did want to make just that point. And perhaps in addition to putting that in the record in detail you could give us now in a general way how this reduction in warheads is divided between nuclear and tactical warheads, and roughly the size of the tactical warheads that have been reduced and so forth.

Mr. ELLSWORTH. With the Senator's permission, I will do that in classified form in my written statement.

[The information referred to is classified and in the committee files.]

Senator CASE. In a general way you can tell us now, can you not? I mean you cannot make a statement that the numbers of warheads have been greatly reduced without telling us in a general way what you mean.

Senator SYMINGTON. I agree with Senator Case. I think that certainly there is an obligation after you brought it up.

Senator CASE. You have to make up your own mind, of course, about the classification, but it seems to me that having made that general statement you have to explain it to some extent. That is my only point.

Senator SYMINGTON. I think it is a point well taken.

Mr. ELLSWORTH. The principal reduction has taken place in the area of strategic weapons warheads.

Senator SYMINGTON. Does that include delivery vehicles as well?

Mr. ELLSWORTH. The number of strategic delivery vehicles has been substantially reduced below the peak, but my initial comment was with regard to actual warheads.

DECREASE IN U.S. STRATEGIC CAPABILITY QUESTIONED

Senator SYMINGTON. As chairman of the Military Application Subcommittee on the Joint Atomic Energy Committee, I know something about this subject. We have our bombers, and we know how many we have. The second part of the triad is our ICBM's which, if anything, have increased their capacity through MIRV'ing. The third part of our triad is the submarine launched ballistic missile force, such as the Poseidon, where we have multiplied many times our capacity as against the Polaris. So when you make this statement that we have decreased our strategic capability, it strikes me as somewhat surprising.

The staff points out a figure that is not classified, that we have some 8,500 strategic warheads, and I know myself about the development of the Minuteman III and Poseidon. So I do not quite understand what you mean.

Mr. ELLSWORTH. In terms of numbers of warheads, in terms of numbers of strategic delivery vehicles, in terms of the total equivalent megatonnage, by all those measures there have been substantial reductions in the numerical measures of our nuclear arsenal. And I would be glad to provide in detail on a classified basis precisely where those reductions have taken place. They have taken place in the reductions of the numbers of bombers compared with the middle 1950's and in terms of air defense.

Senator SYMINGTON. I would be glad to get that. But just one more question and then I'm going to yield to my colleague. Just one more observation.

Twenty years ago we did not have any submarine-launched missiles.

Mr. ELLSWORTH. That is right.

Senator SYMINGTON. And then we got quite a few. In fact I think about 41, and then of those 41 we changed 31 into Poseidons.

Mr. ELLSWORTH. Yes.

Senator SYMINGTON. And each Poseidon has 10 warheads—this is all a matter of public record—and, therefore, in the last 20 years you have gone from nothing in the way of SLBM's to where you have 31 times 16 missiles times 10 which comes to 4,960 warheads that we have now that we did not have 20 years ago.

And in addition to that, you have MIRV'd quite a few of your ICBM's and 20 years ago you did not have any ICBM's.

So if you are correct, and I would be very glad to look at your figures, what you are talking about can only be the number of strategic warheads available to airplanes. Am I correct?

Mr. ELLSWORTH. That is correct. The number of warheads deliverable by bombers plus strategic defensive warheads has decreased.

Senator SYMINGTON. I beg your pardon?

Mr. ELLSWORTH. The number of strategic defense warheads has decreased.

Senator SYMINGTON. Air defense warheads are not strategic offensive weapons.

Mr. ELLSWORTH. The nuclear air defense weaponry was considered as a part of the nuclear arsenal.

Senator SYMINGTON. Not as a strategic offensive weapon.

Mr. ELLSWORTH. Not as a strategic offensive weapon, but still as a strategic defensive weapon inasmuch as it was designed to defend against the incoming strategic systems of the other side.

Senator CASE. The point is that you are including such reductions in your earlier statement.

Mr. ELLSWORTH. Certainly.

Senator CASE. I think that exchange has been useful to try to clarify what was meant, because I think to the average person it would imply that we had reduced our offensive capability which is not the fact.

Mr. ELLSWORTH. Senator, I think there is a misapprehension on the part of the average person that we are engaged in an endless spiral of increasing of our nuclear arsenal. I will be glad to provide the detailed numbers.

Senator CASE. The question is what the facts are, and we do not want to play on words. What category do the 7,000 missiles in NATO come under in your classification?

Mr. ELLSWORTH. I am not certain what you mean.

Senator CASE. There are 7,000 weapons in Europe.

Mr. ELLSWORTH. Those are tactical nuclear weapons.

Senator CASE. Entirely?

Mr. ELLSWORTH. Yes.

Senator CASE. And they have not been reduced?

Mr. ELLSWORTH. That is correct.

DISTINCTION BETWEEN TACTICAL AND STRATEGIC WEAPONS

Senator CASE. It is not just a question of the size of the missile, is it? When you make a distinction between tactical and strategic, it is just not based on size?

Mr. ELLSWORTH. No, not just based on size.

Senator CASE. It is based on deployment for use?

Mr. ELLSWORTH. It is based on deployment for use and on the capability of the delivery system.

Senator CASE. Suppose you put a nuclear weapon on one of these Pershing missiles. What would that be?

Mr. ELLSWORTH. It has a range of about 400 to 460 miles, nautical miles and therefore cannot be considered a strategic offensive missile for the United States.

Senator CASE. With a nuclear weapon?

Mr. ELLSWORTH. Yes, sir.

Senator CASE. And about 300 with a conventional weapon, and you would say that was a strategic or—

Mr. ELLSWORTH. There are not any that are equipped with conventional warheads.

Senator CASE. No? What was that?

Mr. ELLSWORTH. There are no Pershings that are equipped with conventional warheads.

Senator CASE. That is not the point. I want to get what a nuclear weapon on a Pershing missile would be classified as under your classification?

Mr. ELLSWORTH. All the Pershings that we have deployed are deployed in the European theater. They are regarded as tactical missiles.

Senator CASE. They could go 460 miles?

Mr. ELLSWORTH. Yes.

Senator CASE. Are there any strategic weapons with a lesser range?

Mr. ELLSWORTH. No.

Senator CASE. The range is an important factor?

Mr. ELLSWORTH. The range is an important factor.

Senator CASE. The important factor? Is there any other factor?

Mr. ELLSWORTH. The location of the base of the deployment.

Senator CASE. It is a kind of loose term then, is it not? I just want to find out what we are talking about.

Mr. ELLSWORTH. By and large strategic means, central system between the two superpowers, those weapons that constitute the central strategic weaponry; that is to say the long-range bombers with range capability to be launched in the one's home country and fly to the other country, plus ICBM's, the intercontinental ballistic missiles plus SLBM's the submarine-launched ballistic missiles. Those generally speaking are the three categories that are spoken of, for the purposes of the SALT talks, as strategic offensive weapons.

Now then, in addition to that the countries also have other weaponry in their arsenals which are not strategic within that definition.

Senator CASE. Where would you put a cruise missile?

Mr. ELLSWORTH. It depends on range and on its launch platform, and its mission.

[The following information was subsequently supplied:]

STRATEGIC AND TACTICAL APPLICATION OF CRUISE MISSILES

[Supplied by Department of Defense]

Cruise missiles are not simply differentiated as to whether they have strategic or tactical applications. They are unmanned airplanes and as such have many potential military applications. Therefore, no single characteristic, such as maximum range capability, can be used to differentiate strategic from tactical applications. Other characteristics, which must be considered are payload, nuclear or conventional, and launcher platform (land, air, submarine or surface ship). For example, a land-based nuclear-armed cruise missile capable of inter-

continental ranges, greater than 5500 kilometers, would clearly have strategic applications while an unarmed long-range intelligence collection drone is clearly not a strategic offensive nuclear delivery vehicle. Air and ship-launched cruise missiles have similar ambiguities. Shorter range air-launched cruise missiles have applications as bomber armaments to aid in penetrating or standing off outside air defenses. Similarly, a submarine-launched cruise missile can be a very effective anti-ship weapon, but with slight modifications can also be used against land targets. Hence, the line is not easily drawn between strategic and tactical applications of cruise missiles.

Senator CASE. Let's take a missile of a 600-mile range.

Mr. ELLSWORTH. I would not include that as a strategic missile.

Senator CASE. Wherever based?

Mr. ELLSWORTH. No, I would not.

Senator CASE. 700?

Mr. ELLSWORTH. No, I would not include that.

Senator CASE. 800?

Mr. ELLSWORTH. No.

Senator CASE. 1,000 miles?

Mr. ELLSWORTH. No.

Senator CASE. 1,200 miles?

Mr. ELLSWORTH. No.

Senator CASE. 1,500?

Mr. ELLSWORTH. No.

Senator CASE. 2,000 miles?

Mr. ELLSWORTH. No.

Senator CASE. Still tactical?

Mr. ELLSWORTH. Right.

Senator CASE. 2,200 miles?

Mr. ELLSWORTH. No.

Senator CASE. 2,250?

Mr. ELLSWORTH. No. 2,500 I would say would be it.

Senator CASE. It came, didn't it? Two-thousand-five-hundred miles?

Mr. ELLSWORTH. Yes.

Senator CASE. Thank you, Mr. Chairman. I think we sort of exhausted that point.

Senator SYMINGTON. You go ahead. I have yielded to you.

Senator CASE. You did?

Senator SYMINGTON. Sure.

Senator CASE. I thought you were picking up on something.

Senator SYMINGTON. I thought that I had taken enough time on my own. It was time to yield. I have some more questions, but I would yield.

CLASSIFYING WEAPONS SYSTEMS AS STRATEGIC OR TACTICAL

I would just make this one point, if I may, about classifying weapon systems as strategic or tactical if we consider aircraft refueling capability and location of the FBA's, forward based aircraft. Inasmuch as one of our FBA's can carry the nuclear power of over a million tons of TNT, over a megaton, I don't see how, especially with the refueling capacity in certain places, you call such systems as only tactical. But that analysis brings up the Soviet Backfire question—backing into the backfire, you might say, and all the problems involved.

Thank you, Senator.

Senator CASE. Of course, while there are these quite occasional lapses into levity, you know we regard this subject as very serious.

Mr. ELLSWORTH. Very serious.

Senator CASE. Perhaps the most serious thing we can face. We are not at all disposed to ridicule or playdown efforts you are making in the Department or that other Government departments are making. We recognize the enormous difficulties involved, and, as far as I know, we have no pat solutions any more than you do to these things. I think you are probably right in saying that each of the efforts is a rather small step, but that together they have a substantial impact on the problem.

STEPS TO CURB WEAPONS PROLIFERATION

I wonder if you could be a little more specific. Could you give us any idea of specific steps we might consider in connection with our own nuclear weapons program and policies on the assumption that self-restraint on our part might be of some significant value in curbing weapons proliferation.

Mr. ELLSWORTH. Well, self-restraint on our part is important. The pursuit of the declared objectives by the parties in the SALT negotiations is important. It is important for us to do as much as we can as a nation to insure that other nations in the world, whether they are allied or friendly with us, do not perceive any intolerable threat to their own security. The efforts that are underway by other agencies of the Government to place safeguards around the whole nuclear fuel business are extremely important. I mean safeguards with regard to the transit of nuclear materials, safeguards relative to the storage of nuclear materials, safeguards with regard to the reprocessing of nuclear fuels. All of these things together are important, and each one of those areas are specific areas where we can act.

The Department of Defense in those latter categories is not the lead actor, and I would not presume to spell out and specify what should be done. The Secretary of State has addressed this subject in his recent speech to the United Nations as well as in other forums, and there are studies underway in the IAEA—the International Atomic Energy Agency—with regards to safeguards. There are steps being taken, and I believe Senator Symington referred to it in his opening remarks, at the Nuclear Supplier Conference, efforts being made there to attach safeguards to the commercial transferring sale of fuels as well as technology.

All of those areas are specific areas where although Defense does not have the lead, steps can be taken to dampen-down the tendency toward proliferation, which suddenly has become in the last few years, particularly with the extremely high price of oil, a real problem for the world.

Senator CASE. I take it that you do not subscribe to the suggestion some people have made that we should not go in for nuclear power?

Mr. ELLSWORTH. No, I would not subscribe to that. I do not think it is possible.

Senator CASE. I guess it is possible, but not feasible, perhaps. Maybe the people would not stand for it.

Mr. ELLSWORTH. That is correct.

Senator CASE. Is it in that sense that you mean that?

Mr. ELLSWORTH. That is correct, and I do not think that it is necessary to deny ourselves nuclear power in order to prevent weapons proliferation.

PRESIDENT'S PROPOSAL CONCERNING NUCLEAR POWER FACILITIES

Senator CASE. Would you comment on the President's proposal for the development of facilities in relation to this problem?

Mr. ELLSWORTH. We need to supply other countries, other potential users of nuclear power facilities, with enriched fuel material, or otherwise they will provide themselves or acquire it elsewhere without the kinds of stringent safeguards that surround our transfer of such material.

INTERNATIONAL AGREEMENT CONCERNING SAFEGUARDS

Senator CASE. Is that the best way to control the situation, or would some kind of a general agreement among all of the nuclear capable powers be sounder? Take our deal without Germany. This has not prevented Germany from dealing with Brazil, for example.

Mr. ELLSWORTH. That is true. Although if I may, on that particular—

Senator CASE. I wish you would comment.

Mr. ELLSWORTH. We are in close consultation with the Federal Republic of Germany.

Senator CASE. That is a nice thing. It is lovely, but what good does it do?

Mr. ELLSWORTH. Well, it is doing some good with regard to the kinds of safeguards that they are going to impose on that transfer.

Senator CASE. This is a very serious point. You do have definite plans for that?

Mr. ELLSWORTH. We are in consultation with the Federal Republic of Germany already on that. We in the Department of Defense are not in the lead on that matter, but we keep in close touch with it. We are pleased with the movement that we perceive.

But, to go to your question directly, of course it would be highly desirable to have all of the nuclear suppliers in agreement in regard to the most rigid kinds of safeguards.

POOLING OF RESOURCES UNDER INTERNATIONAL AGREEMENT

Senator CASE. How would you regard a pooling of all of the resources for the production of nuclear materials and their enrichment under an international agreement?

Mr. ELLSWORTH. I would regard that as desirable. It seems to me that would provide an opportunity to monitor and control and to provide safeguards on the whole process.

GOVERNMENT VERSUS PRIVATE OPERATION OF INCREASED NUCLEAR ENRICHMENT FACILITIES

Senator CASE. From the standpoint of the Department of Defense, is it a matter of consequence whether increased nuclear enrichment

facilities be operated by the Government or by private industry under extensive Government guarantees?

Mr. ELLSWORTH. I don't know what the Department of Defense's position on that is. May I find that out?

[As of the date of publication, the information referred to had not been supplied.]

Senator CASE. You may indeed. In the meantime, if you have a personal view without prejudice to the Department of Defense's position, I would be glad to have it, because we may have to deal with this fairly soon.

Mr. ELLSWORTH. If I may, I will finesse that, Senator.

Senator CASE. Do what, finesse it?

Mr. ELLSWORTH. I would rather speak authoritatively for the Department, and would have to staff out a written reply.

Senator CASE. Would you be willing to tell us privately your private views?

Mr. ELLSWORTH. Yes.

Senator CASE. OK. You have teased us now. You really have something, have you?

The record will have to note that the witness smiled.

Mr. ELLSWORTH. I thought when you referred to my giving you my private views that you meant after the hearing was adjourned.

Senator CASE. Yes.

Mr. ELLSWORTH. Yes; certainly.

Senator CASE. I did. I did.

U.S. DEFENSE ADJUSTMENT IN EVENT OF FURTHER PROLIFERATION

You noted that the problem of proliferation would require both constructive means to defer weapons acquisitions and also comprehensive planning to adjust our country's defense in the eventuality of further proliferation. Would you give us a general idea of what you have in mind?

Mr. ELLSWORTH. Yes; what I have in mind is that nuclear weapon proliferation as a threat to the security of the United States would depend on who proliferates and, the area of the world, their capability; that is to say, their capability to design and construct effective weapons, their ability to design and construct a capable delivery system. As I indicated elsewhere in my statement, it is one thing for a country to acquire a nuclear weapon capability; that is, a small country with very limited capability, with no access to modern delivery systems, while it is quite another matter to see a modernized industrial nation with the full range of industrial capabilities both for weapon development, to design and manufacture nuclear weapons. So, it would depend on where the proliferation took place, as to what our defense plans will have to be in reaction to that proliferation.

PNE ASSISTANCE TO OTHER COUNTRIES

Senator CASE. You have noted that the executive branch is trying to inhibit the use of peaceful nuclear explosions by nonnuclear nations. Article V of the Non-Proliferation Treaty though provides for help on peaceful explosions by the nuclear powers under international aus

pices. Are you doing anything to assist explosions by other countries?

Mr. ELLSWORTH. Well, first of all, the United States and the Soviet Union are negotiating to provide a Peaceful Nuclear Explosions Treaty that is in accordance with article III of the Threshold Test-Ban Treaty that we signed with the Soviet Union.

The only active PNE projects are in Russia, the Kama-Pechora Canal, and one in Egypt, the Qattara Depression project. I have to say that any major nuclear excavation project is likely to violate the Limited Test-Ban Treaty.

Senator CASE. Do these two that you mentioned?

Mr. ELLSWORTH. Well, if they are above a certain limit, they would.

Senator CASE. What is the prospect in respect to them?

Mr. ELLSWORTH. Those are the only ones that are under active consideration that we know of and I don't know their prospects for developing into actual work projects.

Senator CASE. But, in effect, any major, perhaps any significant peaceful nuclear explosion is very likely to violate the emission sections of the treaty?

Mr. ELLSWORTH. Any excavation shot?

Senator CASE. Yes.

Mr. ELLSWORTH. An excavation project would be likely to violate that treaty.

Senator CASE. So we are not doing anything beyond this Egyptian project—

Mr. ELLSWORTH. Well—

Senator CASE. If we are doing anything there. Are we?

Mr. ELLSWORTH. Not that I am personally aware of. That is a project which I mentioned because, of course, it has been reported that the Egyptians are interested in it. I am not aware of any U.S. Government participation in it.

Senator CASE. Or any other outside of the United States?

Mr. ELLSWORTH. No, not to my knowledge at this time.

Senator CASE. I guess, Mr. Chairman, I do not have anything further now.

Senator SYMINGTON. I will proceed and maybe with that mind of yours you will think of another group of questions that will be rewarding.

Senator CASE. I know yours has been refreshed with introspection.

SIZE OF U.S. NUCLEAR ARSENAL

Senator SYMINGTON. I'm a little worried about this business. Did you mean less warheads, less launchers?

Mr. ELLSWORTH. Warheads, launchers, and equivalent megatonnage.

Senator SYMINGTON. I think you are wrong.

Mr. ELLSWORTH. Gross EMT.

Senator SYMINGTON. I think you are wrong on that. I think you had better check it.

Mr. ELLSWORTH. I will.

Senator SYMINGTON. I have a figure here that says we had 8,500 force loading weapons in the mid-1975 as against 7,650 in 1974. Would you disagree with that?

Mr. ELLSWORTH. I'm not familiar with those numbers.

Senator SYMINGTON. Then I have here figures the Chairman of the Joint Chiefs gave us that show a reduction of 2,500 down to under 2,000 for launchers. But it is my considered opinion that the number of strategic warheads themselves has considerably increased, so we have a discrepancy that I think we had better clear up.

Mr. ELLSWORTH. Yes.

Senator SYMINGTON. Because if I'm wrong I want to let the record show it. And if we are right, the difference may be one of counting launchers versus warheads. I think it is very hard for me to see how you could have less warheads strategically when we have been and are MIRV'ing everything right and left to the best of our ability.

HISTORIC ALLIES

You speak in your statement of historic allies. You say, "proliferation by a country with limited resources, a record of governmental instability, and situated in a region with antagonistic neighbors would have more serious implications for the United States than proliferation by an industrial power who is also an historic ally." What is your definition of an historic ally? Let's leave Britain out of it, because I think it is fair to say they have always been a historic ally. What other countries would you call historic allies?

Mr. ELLSWORTH. I would like to avoid naming countries because this is an open hearing. I would say that an historic ally or friend would be a country who has been allied or friendly with us for at least 25 years.

Senator SYMINGTON. In World War II, two of our three best friends were probably China and the Soviet Union, and our two greatest enemies were Germany and Japan. It looks like that has reversed itself almost 180° in the intervening years. And you yourself, because of your NATO experience, know the problems incident to France and NATO and so forth.

As Lord Palmerston once said, "No country has permanent enemies or permanent friends, only permanent interests." No country has been a permanent friend of the United States except Britain, and I know of no highly industrial country in the last 50 years that has not been for us at one time and against us at another. I may be wrong on that, but I believe that, with perhaps one or two exceptions, that is correct.

POTENTIAL PROLIFERATION: EXAMPLE OF BRAZIL

I bring this up because I want to give an illustration of potential proliferation. We all know of the fear of potential German military strength that has been characteristic of both France and the Soviet Union. The recent nuclear enrichment deal made by Germany with Brazil is very interesting. It gives Brazil a full enrichment and re-processing cycle, not just the capacity to make electric energy. And as you know, Brazil has not signed or ratified the Non-Proliferation Treaty, and it has uranium ore deposits. What would prevent Brazil from some day shipping weapons it produces to some of the oil-rich countries of the Middle East or to countries we have given large amounts of foreign aid to and consider to be our friends?

What would prevent Brazil from shipping weapons even to the Germans for that matter if the Germans decided at some point that they wanted to get into a nuclear race? West Germany is a member of the Non-Proliferation Treaty, but they could get out of it with 90 days' notice. Is there any way we could really stop such actions?

Mr. ELLSWORTH. Well, Senator first of all let me say that I am somewhat encouraged by the fact that we are still in consultation with the Germans with regard to antiproliferation safeguards in connection with that deal. As you know yourself, the main nonproliferation elements of the agreement include first, nonuse of nuclear explosives.

Second: IAEA safeguards are to be applied on all equipment, facilities, and materials.

Third: no re-export of these items without IAEA safeguards and Federal Republic of Germany agreement.

Senator SYMINGTON. Have you personally read these IAEA safeguards?

Mr. ELLSWORTH. No; I have not.

Senator SYMINGTON. Because, practically speaking, they don't mean much. We went over there and spent days in Vienna to find that out.

Mr. ELLSWORTH. Additionally, there would be no time limit on the safeguards.

Physical security procedures would be stipulated and, the Federal Republic of Germany will participate in trilateral IAEA safeguards. The whole spectrum of these kinds of nonproliferation elements are in the agreement together with the willingness of the Germans to continue to consult with us. This gives us some comfort with regard to having a fairly safe deal.

U.S. PROTESTS CONCERNING GERMAN-BRAZILIAN DEAL

Senator SYMINGTON. Did you protest that deal in the Defense Department?

Mr. ELLSWORTH. I beg your pardon?

Senator SYMINGTON. Did you protest the deal in the Defense Department?

Mr. ELLSWORTH. I do not know whether we did or not.

Senator SYMINGTON. Well, I know the State Department testified they did.

Mr. ELLSWORTH. Yes.

Senator SYMINGTON. And I know also that an American corporation stated it did its best to get the deal but was prevented from getting it by our Government because of proliferation considerations. That decision cost that company many billions of dollars of business and some 20,000 jobs.

And what worries me is that this proliferation capability that we refused to export occurred anyway. The State Department testified to us that they did their best to stop the German-Brazilian deal. But the German Government, specifically the chancellor of West Germany, said they have not had a single complaint against the deal from anybody.

If we are going to say that the German-Brazilian deal is closed, can't be reversed, and is all right with us anyway because we are work-

ing together on the safeguards, they I cannot see why we did not let the American company have the deal in the first place.

Mr. ELLSWORTH. I cannot comment on that because I do not know what the background of it was. I am speaking of the Department of Defense interests in making sure that the agreement is adequately safeguarded.

WHETHER IAEA RESTRICTIONS HAVE REAL SUBSTANCE

Senator SYMINGTON. What I'm trying to get at is whether you feel IAEA restrictions have any real substance as against merely form.

Mr. ELLSWORTH. We are working with the other elements of our own Government in attempting to strengthen the IAEA.

Senator CASE. It really does not amount to anything does it? It is nonaccounting, is it not?

Senator SYMINGTON. It is really nonaccounting because the Government does not have to have reinspection. In addition, there is the 90-day escape clause in the Non-Proliferation Treaty. A country could make all the preparations to get out in 90 days while it is receiving nuclear technology and equipment under cooperative, peaceful, and inspected conditions. This is what worries us so much, as we watch this proliferation develop all over the world because of the interest many nations have in nuclear energy. Have the Brazilians agreed to allow international inspection of their nuclear programs?

Mr. ELLSWORTH. Yes; they have. Dr. Landauer thinks they have. Do you want to speak to that?

Dr. LANDAUER. I understood that they have agreed to inspections.

Senator SYMINGTON. IAEA supervision?

Dr. LANDAUER. Yes.

Senator SYMINGTON. Would they do that even though they refused to sign or ratify the Non-Proliferation Treaty?

Dr. LANDAUER. Senator, the formal signatures have not been finalized by the Board of Governors and the governments involved. That is possible. But I think that they are on the way toward agreeing to these IAEA safeguards.

STRENGTHENING NON-PROLIFERATION TREATY

Senator SYMINGTON. In your statement, Mr. Secretary, you say the U.S. Government supports and advocates strengthening of the Non-Proliferation Treaty. How do you propose to strengthen it?

Mr. ELLSWORTH. First of all, Senator, as indicated in the text, all of the parties to the treaty at this recent conference that took place in May stressed the importance of extending the application of safeguards to all peaceful nuclear activity, of the importing States particularly, that are not party to the treaty, and we are engaged in Government efforts directed toward implementing that idea.

Senator SYMINGTON. Are we talking about any specific action? The U.S. Government supports and advocates strengthening of the Non-Proliferation Treaty. Have we presented any "either/or" about signing the NPT to any of these countries?

Mr. ELLSWORTH. Well, of course, our policy is to attempt to exert what persuasion we can on countries that have not signed the treaty to sign the treaty.

STRENGTHENING IAEA AND ITS SAFEGUARDING ACTIVITIES

Senator SYMINGTON. You also mention strengthening the International Atomic Energy Agency and its safeguarding activities. How do you plan to do that?

Mr. ELLSWORTH. Senator, it is mostly a matter of additional funding.

Senator SYMINGTON. Pardon?

Mr. ELLSWORTH. I say it is mostly a matter of funding.

Senator SYMINGTON. You mean that you would not want to see it with additional clout, you might say, from the standpoint of inspection?

Mr. ELLSWORTH. Yes, we would. And in order to bring that about and make it more effective requires additional funding.

Senator SYMINGTON. But you would have to change the regulations of the IAEA in order to have national inspection, would you not, and verification, for example?

Mr. ELLSWORTH. They do have inspections.

Senator SYMINGTON. They only do that if the country approves, you see. In other words, there is no inspector general of the IAEA who has overall authority on inspections. If the country says you cannot look, they cannot look under the IAEA agreement, so there is a lot of form in that as against substance in the inspection system. What would you do with more money for the IAEA?

Mr. ELLSWORTH. Hire more inspectors. Dr. Landauer tells me that no country ever has rejected an IAEA inspector coming into their country.

Senator SYMINGTON. The Soviet Union has never objected to the IAEA coming into their country?

Dr. LANDAUER. The Soviet Union being a nuclear weapons state is not obligated by the Non-Proliferation Treaty to have safeguards on its material.

Senator SYMINGTON. As I understand it you are saying that a country, if it signs the Non-Proliferation Treaty, agrees to have these inspectors to come into their country?

Dr. LANDAUER. If it has safeguarded nuclear materials, yes.

Senator SYMINGTON. Suppose the Brazilians in gratitude for the Germans giving them the enrichment process ship back weapons into Germany. Brazil has not signed or ratified anything, but would we have the right under the IAEA, inasmuch as Germany has signed the treaty, to inspect the matter in Germany?

Dr. LANDAUER. Germany, by signing the Non-Proliferation Treaty, has agreed not to accept nuclear weapons.

Senator SYMINGTON. Will you pull that microphone over to you a little bit?

Dr. LANDAUER. Germany, by signing the Non-Proliferation Treaty, has agreed not to accept nuclear weapons.

Senator SYMINGTON. You think that that would be followed unless they decided to get out?

Dr. LANDAUER. Well, if they decided to get out, that is a problem.

Senator SYMINGTON. And how long would it take them to decide to get out?

Dr. LANDAUER. Well, as you have stated, earlier, there is the 3-month provision.

DIFFICULTY OF KEEPING COUNTRIES IN CHECK

Senator SYMINGTON. Yes. I'm still a little skeptical about this idea of historical allies. For instance, when I was in Brussels in 1969 we were told that whereas politically the French had left us, militarily they were working with us. However, the military people knew before who were over there. Say that was not true, that the French were not carrying out their obligations. I think it is going to be very difficult to keep some of these countries in check for two reasons.

First: Many of them don't want to be second-rate powers.

Second: There is this tremendous demand on the part of certain countries, Japan, for example, to have nuclear energy. They have no oil or coal to speak of, despite a large effort of exploration. Therefore, they now have a big nuclear energy program.

What I am trying to do is to find out if there is anything meaningful in the IAEA, because we set it up to carry out a very important function. I would like to ask you if the IAEA will ever have any real enforcing capability to insure that its provisions are being carried out?

Dr. LANDAUER. No, I don't think so. I think it is only one part of the total nonproliferation effort. And it has an important role, but some of these other efforts that are listed are complementary to it, and provide additional safety against the proliferation that we don't want to see happen.

Mr. ELLSWORTH. Senator, with regard to some of the countries you have mentioned, I think that the main inhibitions against proliferation, area:

First: The fact that the countries involved do not perceive their national security requiring them to provide themselves with nuclear weapons.

Second: That there are internally in some of those countries very great political and psychological resistances to the acquisition of nuclear weapons.

Third: There are in the surrounding countries, and as far as that is concerned, elsewhere in the world very great political resistances to those countries going nuclear. And I think that quite apart from the IAEA, which is, as Dr. Landauer says, a supplement to other elements in the picture, I think that those are the main deterrents or inhibitions against some of those countries that you have mentioned seriously contemplating going nuclear in the foreseeable future.

But for the unforeseeable future and what that brings no one can tell us. But in the foreseeable future I think what I have said is correct.

MAKING SURE NONNUCLEAR ALLIES DON'T FEEL THREATENED

Mr. SYMINGTON. You did say in your statement that the U.S. effort to make sure nonnuclear allies do not feel threatened will have a large role in persuading these allies not to go nuclear, but how would you reassure our allies? What specific action by the United States might be involved?

Mr. ELLSWORTH. Well, I think in the case of all of the countries of Western Europe that belong to the NATO alliance, and supplemented by the force deployments of the United States, together with the force deployments of other allies are the principal means by which those

countries shape and form their national security and their perception of their national security position.

In Asia, I think that the bilateral treaties that we have with Japan and with South Korea, together with our force deployments in North-east Asia are the principal elements in both of those countries perceptions of their national security positions.

SIX OR SEVEN COUNTRIES EXPECTED TO DEVELOP NUCLEAR WEAPONS CAPABILITY

Senator SYMINGTON. According to intelligence estimates, over the next 5 years about six or seven countries, and we believe we know what countries they are, will develop nuclear weapons capability. In light of this, is the Defense Department taking any steps to shape American defense strategy to meet this potential new threat?

Mr. ELLSWORTH. Of course we are developing plans, Senator, against those contingencies.

SOUTH AFRICAN SITUATION

Senator SYMINGTON. Another situation that worries me a lot, thinking about the world, is these long and apparently successful efforts of South Africa to get into the uranium enrichment business. Are we working with them on proliferation aspects of this situation? Are they signers of the Non-Proliferation Treaty?

Mr. ELLSWORTH. They are not.

Senator SYMINGTON. I don't think they are. The staff tells me that they have not signed or ratified it. And they have, as you know, large uranium supplies from their waste from mining gold along with this new method of enrichment, which may make it possible for them to make weapons easier. A country in that position, with the minority ruling it, would be a country that might be very desirous of getting nuclear weapons from the standpoint of defense. You agree with that, don't you?

Mr. ELLSWORTH. I'm sorry, Senator. I was referring to my notes.

Senator SYMINGTON. I just say South Africa could develop nuclear weapons the way things are going, and they might do it from the standpoint of their own defense, wouldn't you think?

Mr. ELLSWORTH. Not necessarily. I'm not certain that their security position requires them to provide themselves with nuclear weapons.

Senator SYMINGTON. They seem to think so. It would appear they are working at it. In fact, they may have the best of all enrichment processes. I am correct on that, aren't I, Doctor?

Dr. LANDAUER. I doubt it. They have a process for enriching uranium about which nobody seems to know the details. You need enriched uranium for light-water reactors, so they are clearly into the civil nuclear business. But beyond that, I don't know that they are interested in obtaining nuclear weapons.

Senator SYMINGTON. I hope you are right. We thought that the Indian Government felt the same way about it. At least the Canadians thought they did. They gave them their systems, of which I always liked the name, CANDU and they did.

You feel more optimistic about this South African situation than the Indian situation, am I correct?

Dr. LANDAUER. I am never optimistic about proliferation.

Senator SYMINGTON. But I thought you felt that South Africa was not proliferating.

Dr. LANDAUER. I do not know that they are working toward a nuclear weapon capability. But I do know that they are working toward a civilian nuclear power capability.

Mr. ELLSWORTH. I think it is important for all of us to keep in mind that there is a substantial step from having an enriching capability for uranium on the one hand, to the step of providing yourself with weapons grade material, and even then, providing yourself with weapons, and adequate delivery systems. That is important for us to keep in mind. There is a step there, and it is a considerable step.

And second, the perception of your national security position in the world, and in the region of the world where you are, is an extremely important element in any nation's decision whether to go nuclear or not. Therefore, it is difficult to make the leap from an enrichment capability, or a nuclear power capability, to providing yourself with nuclear weapons.

INCREASED DIFFICULTY OF CONTROLLING NUCLEAR PROLIFERATION

Senator SYMINGTON. Yes. I agree with you on the second point, but on the first point I don't. My opposition would extend from what was told me by one of the greatest of all nuclear scientists who runs one of our leading laboratories.

In natural uranium, you have 0.73 percent enriched material in U^{235} and to make electric energy you have to enrich it to around 3 to 4 percent. Correct me, Doctor, if I'm wrong on this. To make a nuclear bomb, you have to enrich it to around 90 percent U^{235} . But, as this scientist pointed out, these countries also need electricity, so what they could do is establish an enrichment process to go from 0.73 to 3 or 4 percent enriched U^{235} and use this enriched fuel in their nuclear reactor to generate electricity. Then they could use the plutonium they get from the waste fuel to make a nuclear bomb. On that basis he was very pessimistic about this continuing proliferation.

And it could be, as I see it, that the atoms-for-peace plan could develop into an atoms-for-war plan if we continue to proliferate nuclear power, because of the possibility of making nuclear weapons. And the only brake we have against that possibility is the IAEA, but we can't seem to find any real way to prevent proliferation. Take Libya for example. Is it not true if Libya decided they would like to join the Non-Proliferation Treaty that we would tell them all we knew about nuclear energy through the IAEA? Then they could withdraw from the Non-Proliferation Treaty if they wanted, could they not?

Mr. ELLSWORTH. Dr. Landauer, who is an expert on the IAEA tells me that anyone can find out information from the IAEA at any time. Senator SYMINGTON. Even though they are not a member?

Mr. ELLSWORTH. Even though.

Dr. LANDAUER. Most of that information that the IAEA generates is available to everybody. I am not quite sure what information you are concerned about that the IAEA has that would be dangerous for Libya to obtain.

Senator SYMINGTON. Well then, as I understand it, you are saying anybody can make this nuclear material and equipment without any additional information if they wanted to, is that correct? Then what is the IAEA, a regulatory body only?

Dr. LANDAUER. Correct.

Senator SYMINGTON. Then it really is a regulatory body that doesn't have the power to regulate. Is that not correct?

Dr. LANDAUER. It would notify the World if there were discrepancies relative to the agreed upon usages of these materials.

Senator SYMINGTON. That would depend upon the willingness to have onsite inspection of all of these facilities, would it not, and the capacity to avoid being fooled? Presumably that is where we would put more money, as the Secretary said. You would like to put it in that field, would you not?

Dr. LANDAUER. That is right.

Senator SYMINGTON. I do not mean to belabor it, but it seems to me proliferation of nuclear weapons is the World's most important problem, as Senator Case pointed out. Because pretty soon, perhaps within some 20 years, there will be about 100 countries that can make these weapons if they want to do it. I have been connected with the nuclear business and the Government since the first explosion in Mexico, and one observation is certain. As time goes on, the weight and size required for a nuclear bomb with the same lethal capacity is less and less. And now we are getting into the problem of intense people and private organizations like the Palestine Liberation Front, the Irish Republican Army, or perhaps a criminal organization. It is going to be increasingly difficult to control this nuclear proliferation, is it not?

Mr. ELLSWORTH. It is a very serious problem.

UPGRADING OF PHYSICAL SECURITY

Senator SYMINGTON. And, as I understand it, you are taking steps to see that we do not lose or have stolen any nuclear material?

Mr. ELLSWORTH. We are.

Senator SYMINGTON. And is the IAEA taking steps to see that the nations that sign the Non-Proliferation Treaty will not lose any of the plutonium produced in their power reactors?

Dr. LANDAUER. They are trying. They have increased their concern about physical security, and they have recently upgraded their physical security guidebook. Hopefully people are going to follow it and in each year have better and more rigorous procedures.

APPOINTMENT OF AMBASSADOR PORTER'S REPLACEMENT

Senator SYMINGTON. Have we appointed anybody to take Ambassador Porter's place?

Dr. LANDAUER. I do not believe that I have seen any indication of a new Ambassador appointed there.

Senator SYMINGTON. I think it shows the relative lack of appreciation of the importance I believe you and we up here feel should be allocated to the IAEA, because the administration has not had anyone in charge of the U.S. delegation now for a great many months. I wonder whether they just think that it is not too important. I know you would agree that it is very important.

AUTOMATIC SANCTIONS FOR NUCLEAR EXPLOSIONS WITHOUT OUTSIDE
INSPECTION

I have a couple or more questions. Do you believe the United States should consider automatic sanctions against nations which explode nuclear devices without outside inspection, Mr. Secretary?

Mr. ELLSWORTH. No I don't. I do not believe, generally speaking, in automatic triggering policies in international relations. I think that you have to consider each case on its own merits, so I am not in favor of automatic sanctions, even in a case like that.

Senator SYMINGTON. Senator Case?

VALUE OF LEADERSHIP IN NOT SUPPORTING PEACEFUL NUCLEAR
EXPLOSIONS

Senator CASE. You yourself have raised a question as to the extent of peaceful nuclear explosions. In a sense, I guess excavation is about all there is in the way of programs for peaceful uses, and our own program is certainly more limited. Would it be of any value as a deterrent if we took the lead in not supporting the peaceful nuclear explosions?

Mr. ELLSWORTH. I don't know, Senator. There is a treaty obligation on the nuclear power to assist nonnuclear countries with peaceful nuclear explosion programs.

Senator CASE. It has sort of gone both ways?

Mr. ELLSWORTH. I do not think I am ready to counsel, renouncing that obligation at this point, although certainly it is true that we ourselves have not yet realized any peaceful nuclear explosion benefits. I do not think we make any effort to make secret the fact that we have not realized any peaceful nuclear benefits, and that our program is very, very small.

Senator CASE. What about underground nuclear testing?

Mr. ELLSWORTH. We are in a process of negotiating with the Soviet Union a treaty that would cover nuclear explosions for peaceful purposes. And I would rather not get into the details of those negotiations.

DIFFICULTY OF EFFORT TO PREVENT PROLIFERATION

Senator SYMINGTON. Thank you very much for coming up, Mr. Secretary. This is a very worrisome problem, and it seems sometimes, as I said to an old German friend of mine one time, "Willie", I said, "how are you getting along". And he said, "The harder I work the behinder I get." And it seems that the more we try to prevent proliferation, the more proliferation we are getting all over the world. And some people think that we are actively promoting it through the so-called atoms-for-peace plan by giving these people the opportunity to make plutonium.

So what shocked me was to have the State Department testify, that they did their best to stop the German-Brazil deal, and then to have high officials of the German Government say they had no criticism from anybody or complaints from anybody on it. You see, that is one of the reasons I raised the questions concerning historic allies. And France is pretty independent of us on nuclear matters. Am I correct on that? Am I not correct that they have not signed or ratified the Non-Proliferation Treaty?

Mr. ELLSWORTH. That is correct.

Senator SYMINGTON. And the Germans are giving an enrichment cycle to the Brazilians.

Mr. ELLSWORTH. When I say correct with regard to the French, I apply it to the fact that they have not signed or ratified the treaty. I do not think it is correct to say they are completely independent of us militarily.

Senator SYMINGTON. I did not mean militarily. I just meant from the nuclear standpoint.

Let me thank you very much for coming up this morning.

Senator, have you anything further?

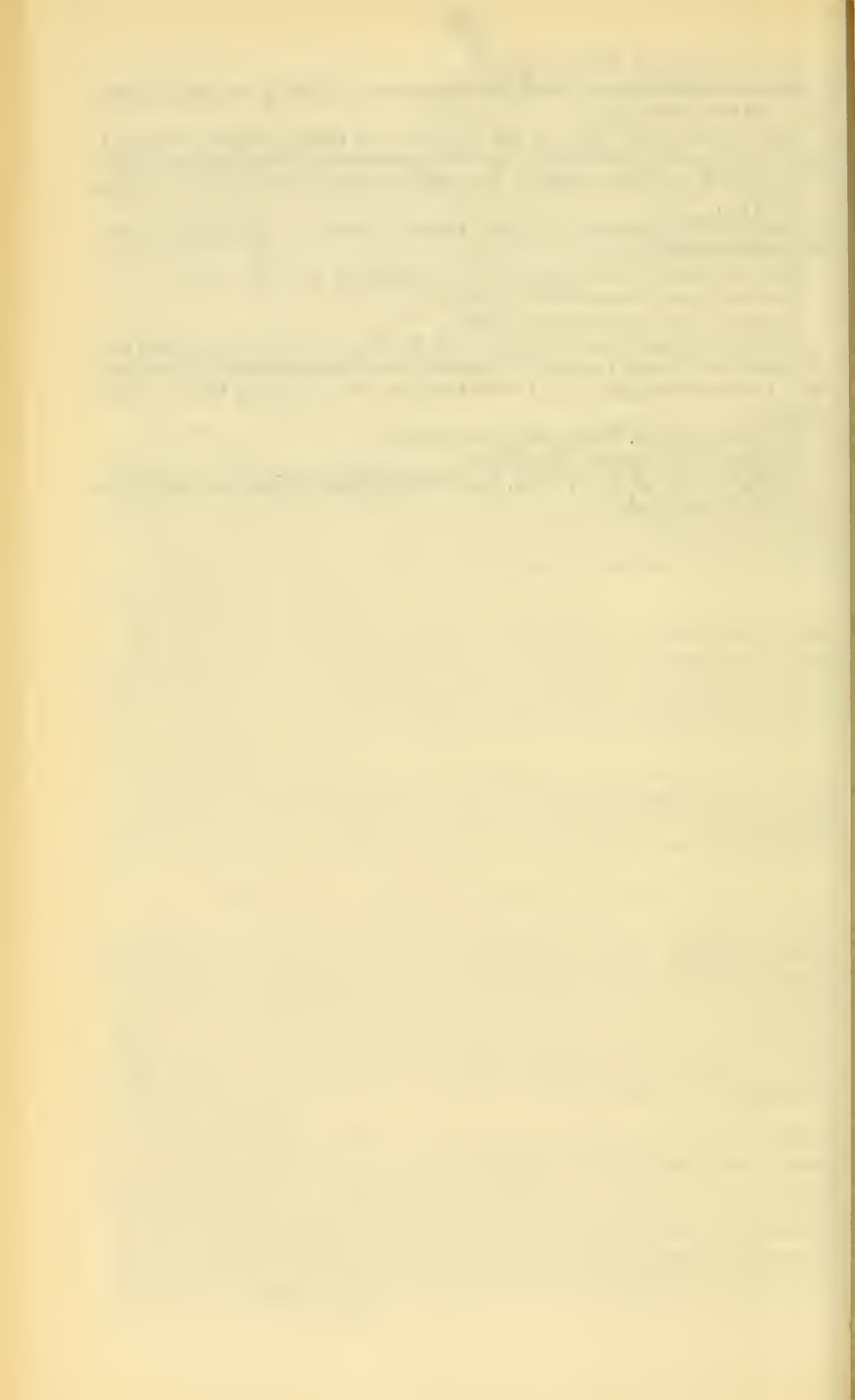
Senator CASE. No more questions.

Senator SYMINGTON. We appreciate it. We are just trying to find out if there is any way to stop this nuclear proliferation, and if you have any further thoughts on it I wish that you would supply them for the record.

Mr. ELLSWORTH. Thank you very much.

Senator SYMINGTON. Thank you.

[Whereupon, at 11:37 a.m., the subcommittee adjourned subject to the call of the Chair.]



NON-PROLIFERATION ISSUES

MONDAY, FEBRUARY 23, 1976

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS, AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met at 10:08 a.m., pursuant to notice, in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senator Symington.

Senator SYMINGTON. The hearing will come to order.

Mr. Director, I have a short statement here I will read.

OPENING STATEMENT

This morning the Subcommittee on Arms Control, International Organizations and Security Agreements of the Committee on Foreign Relations will receive testimony from Dr. Fred C. Ikle, Director of the Arms Control and Disarmament Agency.

The purpose of this hearing is twofold: First, to receive the latest views of Dr. Ikle on nonproliferation issues; and, second, to review with the Director some of the arms control issues of particular concern now.

When the SALT I accord was reached in 1972, it was generally greeted as a major step toward putting a cap on the arms race. The strategic arms race has continued, however, and uncertainty has grown over just what was achieved in SALT I and whether SALT II offers promise.

Our difficulties with respect to Angola have fueled concerns among Americans about the merits of efforts to reach agreement with the Soviets.

To some, détente has become—and I use the phrase advisedly—a grand illusion. With that premise, SALT may be the most visible manifestation of this illusion.

There is illustrated justification for that pessimism, but we all want to continue efforts to control strategic arms to prevent a future armageddon.

We may have expected too much of détente and of SALT. The problems of the 4 years since SALT I have been very sobering.

It may be that all we can expect of this so-called détente is a mutual avoidance by the two major powers of direct confrontation and a toning down of the rhetoric of belligerence.

It may be that all we can expect of SALT is that the letter of agreements will be adhered to if we keep a careful watch and that the so-called spirit of SALT won't be of any certain value.

Even if there is nothing more to détente and to SALT, it is necessary for us to ask ourselves, what is the alternative? Should we forgo further strategic arms limitation talks? Should we simply let the interim agreement expire and thus remove the controls achieved so far?

Should we dismantle the Standing Consultative Commission, our present forum for dealing with agreement compliance questions and other issues between the two sides? Would the result be a reinvigorated arms race even more vicious than the continuing one? And if so, what would be the end of the race?

But if the way is open, however, for a SALT agreement to be a good bargain, it looks like that is something we might well follow.

We can always choose to give up on SALT. Once given up, however, with proliferation continuing around the world, it might give us a problem that we could never get the scorpions back in the bottle on any basis.

As I see it today, a tightly drawn SALT agreement, with each aspect of the agreement able to stand on its own as a sound limitation could be in the mutual interest of both sides and in the national security interests of this country.

In hearings held by this subcommittee last year, witnesses made it clear that the nuclear arms race is not just between the present nuclear powers. The nuclear arms race appears to be spreading all over the world, primarily as a result of a dissemination of nuclear power to make electrical energy, to wit, such arrangements as have been recently made by the Germans with the Brazilians, and at least under discussion by the French with the South Koreans.

Increasingly serious problems include the present lack of effective safeguards against the diversion of nuclear materials from peaceful programs to military purposes.

We see a growing list of nations with the ability and the possible intent to make nuclear weapons, and the failure so far of the nations of the world to decide upon adequate steps to protect against the dangers of nuclear proliferation.

Further nuclear proliferation can mean the world will face increasing instability and insecurity, because any nation or any group of people with nuclear weapons can only be a grave threat to virtually any other country.

For years, as you know, I have been trying to get this matter out more before the people. I am glad to see that it is now becoming a matter of more interest to more people.

That completes my remarks. I welcome you here today. Would you identify your colleagues.

STATEMENT OF FRED C. IKLE, DIRECTOR, U.S. ARMS CONTROL AND DISARMAMENT AGENCY; ACCOMPANIED BY JAMES L. MALONE, GENERAL COUNSEL, AND CHARLES VAN DOREN, DEPUTY ASSISTANT DIRECTOR OF THE NON-PROLIFERATION AND ADVANCED TECHNOLOGY BUREAU

Mr. IKLE. To my left is Mr. Malone, general counsel, James Malone. To my right is Charles Van Doren, deputy assistant director of the Non-Proliferation and Advanced Technology Bureau.

Senator SYMINGTON. Of what agency?

Mr. IKLE. The U.S. Arms Control and Disarmament Agency.

Senator SYMINGTON. Gentlemen, we welcome you here with Dr. Ikle. You have a prepared statement, have you not?

Mr. IKLE. Yes, Mr. Chairman, I have a brief prepared statement. I would propose to read it, if it is agreeable with you.

Senator SYMINGTON. I would appreciate it if you would.

Mr. IKLE. It is quite short.

Mr. Chairman, I greatly appreciate this opportunity to appear before this subcommittee.

This morning I would like to comment on two kinds of initiatives undertaken by the Arms Control and Disarmament Agency and the executive branch to deal with nuclear proliferation.

The first concerns nuclear exports; the second, multinational nuclear fuel-cycle centers.

U.S. INITIATIVES CONCERNING USE OF CIVIL NUCLEAR EXPORTS

The United States over the years has sought to work with other countries to insure that civil nuclear exports would be used only for peaceful purposes. We have recently had a number of bilateral and multilateral discussions with nuclear exporters to develop common rules on safeguards and export controls. As a result, the United States, together with other exporters, has decided to apply certain principles to our future nuclear exports. Most of these are consistent with current U.S. practice; some are new. All are designed to inhibit the spread of nuclear weapons while permitting nuclear exports of equipment to meet the world's growing energy needs.

SECRECY OF EFFORTS CONCERNING NUCLEAR EXPORTS QUESTIONED

Senator SYMINGTON. Why is this effort held so secret? Why do some countries say they don't want people to know what is being decided on?

Mr. IKLE. My guess, Mr. Chairman, is this has to do with internal considerations of these countries. We, the United States, have no particular desire to be coy about these efforts which we think are in the world interest to enhance nonproliferation.

But we felt it was desirable, in order to advance this difficult understanding, to accede to the wishes of certain other countries.

Senator SYMINGTON. What other countries wanted secrecy?

Mr. IKLE. If I answered that question in open session, then we would have, I think, violated the undertaking we have given them, an undertaking which we accepted in order to advance this very difficult consensus.

Senator SYMINGTON. I don't see why, especially in some of these countries, not totalitarian countries, the information is not given to the people.

Let me give you an illustration. I have an ICBM base in my State, on the outskirts of Kansas City. We went to the Defense Department and asked, based on the theory of Dr. Schlesinger for "limited strategic nuclear war," how many people would be killed. The word came back from the Pentagon 800,000.

Based on discussions with many people, including you, I knew, we knew, my staff, the Joint Atomic Energy staff, Foreign Relations Committee staff, the Armed Services Committee staff, we knew that figure was a joke.

So we said now this can't possibly be right. If you are going to have a limited strategic nuclear war, which would delight all those people who want to build a lot of additional things that maybe we need, and maybe we don't, how many people would be killed?

The second answer was a little different than the first. Instead of 800,000 they said 22 million, including 800,000 Canadians.

The irony of this situation is that we constantly hold back how dangerous it is getting from the people of this country and all the other countries.

Mr. IKLE. I fully agree with you, Mr. Chairman. I think it is worth making a distinction here, the distinction between telling the world about the effects of nuclear weapons and pointing out how destructive and how catastrophic these effects can be.

I am totally in agreement with the rest of your remarks. We have issued indeed a publication about the worldwide fallout effects of a large attack, since we believe that all countries ought to be informed, especially military staffs of potentially aggressive countries for whom this worldwide fallout might create an ecological backlash upon themselves.

On the other question, about the key nuclear exporters that are well informed about nuclear matters, that is why they can export. We simply are confronted with domestic political considerations in other countries which have led some of the countries to strongly prefer that, for the time being, a certain privacy be maintained about these talks.

We have no such preference; but we felt that by giving in on this point we could go further with this understanding in the short run.

Senator SYMINGTON. It is hard for me still to understand the secrecy aspect. Dr. Ted Taylor has told us that any intelligent scientist who reads a description of the nuclear bomb in the new Encyclopedia Britannica, which we understand was written by Dr. John Foster, a famous nuclear physicist, formerly Research Director for the Pentagon could make one of these weapons by himself, if he could get hold of some plutonium. Pretty soon, as you know, it will be pretty common property all over the world.

With that type or character of problem facing the world, I would hope we don't get into any more of these secret agreements.

I think the people are getting very tired of secret agreements *per se*, based on recent events. I would hope we could get this matter out before the people. If anybody can do it, it is your agency.

Mr. IKLE. Mr. Chairman, the next page I was about to read from explains in public what we, the U.S. Government; are doing.

Senator SYMINGTON. I just wanted to bring it up at this point. You proceed, will you?

Mr. IKLE. It is only in deference to some other countries that we did not give their names at this point.

Senator SYMINGTON. I have to ask, as long as you mention that, why would they not be willing to give their names?

Mr. IKLE. Apparently there are domestic considerations.

Senator SYMINGTON. What do you mean by that?

Mr. IKLE. Internal political considerations which led to their preference not to be openly named in this undertaking to control nuclear exports.

Senator SYMINGTON. But I am not talking about a totalitarian state now. I am talking about presumably democracies. Why would it be an internal affair so far as their country was concerned not to give their citizens the same type and character of information that I know you should give ours?

Mr. IKLE. My guess is there might be a division of opinion in some places as to whether they should maximize commercial advantage by exporting whatever they can, regardless of proliferation on the one hand; and, a more sober opinion, having the long-term interest of their country in mind, that are willing to join with us to control these exports—while there is a struggle between what I would call the enlightened forces that are willing to control the exports and what I would call the shortsighted forces.

An all-out public debate on this subject might not be to the advantage of some governments at the present time.

Senator SYMINGTON. If you are correct in that, I think what you are saying is the forces of evil in that country have conquered the forces of justice and right.

Mr. IKLE. More likely they are in balance, and I think the balance is tilting in the right direction.

Senator SYMINGTON. Will you proceed?

PRINCIPLES TO BE APPLIED TO FUTURE NUCLEAR EXPORTS

Mr. IKLE. The principles on which we have agreed include the following:

The requirement that recipients must apply international (IAEA) safeguards on all nuclear imports.

The requirement that the recipients give assurances not to use these imports to make nuclear explosives for any purpose, whether called "peaceful" or not.

The requirement that the recipients have adequate physical security for these imported nuclear facilities and materials to deter theft and sabotage.

The requirement for assurances that the recipients will demand the same conditions on any retransfer of these materials or types of equipment derived from the original transfer to third countries.

Now, on the question of more sensitive exports—those which involve fuel enrichment, spent fuel reprocessing, and heavy water. We intend to exercise restraint in supply of these exports, particularly when we think they could add significantly to the risk of proliferation.

In addition, in cases where we do export sensitive technology, we require that the recipients obtain our consent before they retransfer any sensitive nuclear technology to a third country.

These are the minimum standards the United States will apply to its nuclear exports. We are prepared to be more stringent when appropriate.

Together with other leading exporters of nuclear technology, we are also committed to followup efforts along three lines.

1. To promote international cooperation in exchanging information on physical security, on measures of protection of nuclear material in transit, and on measures for recovery of stolen nuclear material and equipment;

2. To improve the effectiveness of IAEA safeguards through special efforts in support of that organization; and

3. To encourage the designers and makers of sensitive equipment, such as reprocessing plants, to construct it in a way that will facilitate the application of safeguards.

U.S. INITIATIVES CONCERNING MULTINATIONAL FUEL-CYCLE CENTERS.

Mr. Chairman, the second kind of initiatives we are undertaking have to do with multinational fuel-cycle centers. The idea for such centers was enclosed in the Final Declaration of the Review Conference held by the parties to the Non-Proliferation Treaty in Geneva last year. At the United Nations General Assembly last autumn, Secretary Kissinger stressed the grave danger posed by the spread of national reprocessing plants to nuclear proliferation and thus to world security.. and proposed establishment of multinational fuel-cycle centers as a safer alternative to national control of reprocessing facilities.

The International Atomic Energy Agency has now begun a major study of the regional multinational center concept; the United States actively supports it, and I expect it will be completed sometime early next year. Preliminary indications seem to confirm our expectation that large-scale multinational centers could achieve significant economies of scale compared with smaller national reprocessing plants. But more important from my perspective, these centers may be an attractive alternative to national reprocessing plants, particularly for countries with more limited nuclear capacity. This alternative then may encourage countries to forgo national reprocessing facilities and work together. This would make safeguards, and the physical protection of dangerous nuclear materials, more efficient and effective. In short, if the concept proves successful, multinational centers could reduce the dangers of further nuclear proliferation and of nuclear terrorism.

Senator SYMINGTON. You are not reading literally from the statement we received.

Mr. IKLE. You should have received a revised statement.

Senator SYMINGTON. I am sorry. The one I have is something considerably different. I noticed that the reporter was following the one you were reading.

Mr. IKLE. There are editorial changes which the reporter has.

The Arms Control and Disarmament Agency has strongly supported the IAEA study by supplying experts and consultants. We have also begun our own study on a broad range of related questions. On such question is whether new approaches to storing spent fuel could forestall premature national reprocessing; another is how to better manage transportation of nuclear materials; and a third focuses on the benefits of international cooperation in radioactive waste management. We are also beginning a preliminary study of the practical steps the United States—both Government and industry—might take to advance the concept of multinational centers abroad.

WHY ACDA WISHES TO BUILD REPROCESSING PLANTS

I was asked recently why ACDA wishes to build reprocessing plants. The question indicates a misunderstanding of our objectives. Our efforts for multinational approaches should not be misunderstood. We do not wish to promote the reprocessing of spent fuel and the resultant recovery of plutonium. On the contrary.

Senator SYMINGTON. If we don't, why do we sell these reactors all over the world under the guise of saying we give them so countries can make electrical energy from nuclear power, noting it is very profitable sometimes to the Americans.

Mr. IKLE. The reactor sales that we are engaged in also envisages that we would furnish enriched uranium fuel which cannot be used for weapons purposes. Such reactors do not require, indeed they do not justify, any national reprocessing capability for handling the spent fuel that would be produced.

PROBLEM OF CONTROLLING DIVERSION OF PLUTONIUM

Senator SYMINGTON. Doctor, you take 0.7 percent of the uranium U^{235} and U^{238} , increase it to 3 or 4 percent and you have enough enrichment to make electric power; increase it to 9 percent, you have a bomb.

Even if you use 3 to 4 percent enrichment to make electric energy, plutonium is automatically produced. So in effect we export methods of getting plutonium, do we not?

Mr. IKLE. That is indeed the serious problem posed by any reactor. The spent fuel does contain, as you say, Mr. Chairman, plutonium.

So long as that plutonium is not being separated and thereby made available for weapons purposes, you still have additional steps that would be required to divert the plutonium.

Senator SYMINGTON. But there would be no additional step that we could be certain to control.

Mr. IKLE. To the extent that we can prevent national reprocessing plants, we do have a handle on it.

Senator SYMINGTON. To the extent, sure.

Mr. IKLE. As I think is implied by your question, it is true that it is much easier for a middle-sized country with some technology to

build a reprocessing plant than it is for that country to build reactors.

Senator SYMINGTON. Just so long as we understand each other; I don't like meetings where we don't get the facts out to the people.

A knowledgeable, leading nuclear scientist of the world pointed out to me that (a), you have uranium in Brazil and (b), despite our protestations, according to the Secretary of State, the Germans gave Brazil a complete enrichment reprocessing setup, enabling Brazil to make bombs for themselves and ship them back into Germany—I am not saying they would, but they could ship them back to Germany in their own ships or German ships and nobody would know anything about it except the two parties involved. Isn't that correct?

Mr. IKLE. What people would know about such a illegal transaction would be a question of our intelligence capability, of course.

Senator SYMINGTON. As you know, there has been quite a little discussion lately about our intelligence capability.

Mr. IKLE. The danger of proliferation is one of the reasons why we need an effective intelligence capability.

PROMOTION OF PLUTONIUM REPROCESSING SUGGESTED

Senator SYMINGTON. I know. I would be the last one to argue about that. But what I am trying to point out is, you make a statement here "We do not wish to promote the reprocessing of plutonium."

You don't say: "We are preventing it." You just say: "We hope we are not promoting." I say we are promoting it. You say: "On the contrary, our hope in all these efforts is to investigate practical, economic alternatives to national reprocessing, and thereby reduce the growing dangers of nuclear proliferation."

Frankly, getting right down to cases, aren't you talking about shutting the barn door after the horse is out?

Mr. IKLE. To some extent that, of course, is our unhappy view today of our rather generous attitude toward sharing nuclear technology that began in 1954.

However, we have never exported reprocessing plants. This country has not. We have opposed and continue to oppose—

Senator SYMINGTON. What is the difference between our giving nuclear information to another country that we have so many arrangements with, like Germany, and them exporting a reprocessing plant to a country that has not assigned or ratified to the Non-Proliferation Treaty?

What is the difference if we give the information to them or Germany does? Wouldn't you say it is a fair possibility that the 1954 atoms for peace plan, after the sad rejection of the group plan developed by people like Lillenthal and Dean Acheson, has turned into an atoms for war plan?

Mr. IKLE. There is no question that the net result of the atoms for peace program was to make nuclear technology more widely available throughout the world.

Senator SYMINGTON. The knowledge of how to make weapons.

Mr. IKLE. The knowledge of how to build reactors, how to build reprocessing plants, how to handle the fuel which then in turn can be diverted to make weapons.

Senator SYMINGTON. That is what I was getting at.

Mr. IKLE. That is the unhappy hindsight view we now have of the program.

INSISTENCE ON SECRECY QUESTIONED

Senator SYMINGTON. I am not trying for hindsight. That is what worries me about the secrecy of the meeting in London. Countries that are not at all totalitarian insist on secrecy. Why not get it all out to see?

You read the statement of the five very well-known and some very famous scientists that Armageddon by the year 2000 is a probability and not a possibility because of the way we have handled this whole situation. That is the kind of statement by people authorized to issue such a statement on this matter that worries me intensely.

Mr. IKLE. In general, Mr. Chairman, I fully support attracting public attention to the risk of nuclear proliferation and ways to mitigate this risk.

I think, Mr. Chairman, what you said in a way mentioned the conclusion of my statement. I would be now pleased to answer any questions you might have.

Senator SYMINGTON. I appreciate your statement very much.

As you know, accompanied by staff members of the three committees I am on—the Armed Services Committee, the Foreign Relations Committee, and the Joint Atomic Energy Committee—we visited Vienna and Geneva last summer and talked to many different people. We reached the conclusion that we are losing control of what has now become a great world danger.

I have the fullest respect for you and think that pamphlet you put out describing this potential danger is one of the finest statements to come out of the Government. I think we have to get together on this and let everybody know just what is going on.

I don't see any hope for preventing what these five scientists—headed up by Dr. Kistiakowsky—prophesied will happen—not could happen but would happen.

NEGOTIATIONS WITH SOVIET UNION

I noticed this morning's paper has a report on a statement by former President Nixon, who is in China. The White House editor declines to make a statement as it hasn't seen the full text.

It says: "There are some who believe that the mere act of signing a statement of principle or a diplomatic conference would bring instant and lasting peace."

The former President said that.

It adds the statement was taken by observers—and it is datelined Peking—as an illusion to the meeting of 35 leaders last year on Helsinki, including 2 years of conferences on European security. And the Helsinki meeting called at the initiative of the Soviet Union resulted in an agreement in which the United States joined on a broad range of East-West issues.

Some observers took the Nixon remarks as veiled criticism of President Ford and Secretary of State Henry Kissinger for their trust in the Soviet Union and in the Helsinki accord.

To be frank with you, with respect to negotiations with the Soviets I am also worried about the Vladivostok accord. Two thousand, four hundred seems pretty high, 1,320 seems pretty high. We have had a lot of development since.

I was wondering, were you appointed by President Nixon?

Mr. IKLE. Yes.

Senator SYMINGTON. I wonder if you agree with this report about the Helsinki agreement being sort of form as against substance?

Mr. IKLE. Let me make two observations. First, I think I do have to make the same answer that you quoted there the White House gave that I haven't seen the statement so it would be hard for me to comment on a statement by former President Nixon that I haven't seen.

Second, you referred to these ceilings, the ceilings of 2,400 delivery vehicles, 1,320 MIRV delivery vehicles.

I agree with you, Mr. Chairman. These ceilings are high, and indeed they are higher than the United States wanted them to be. There was unanimous preference for lower ceilings.

But in negotiations there comes a time when you have to take what you can get and then build on it.

I think one advantage of having an understanding on these upper ceilings, which are far too high from the arms control point of view is that you can in the future go forward and try to press for reductions. Once we have this equality, it should be easier in the future.

Senator SYMINGTON. I accept your answer. I would appreciate your frank opinion classified or declassified—and I would hope declassified—after you have read what was said.

Mr. IKLE. I will send you my reaction to the statements after I have seen them.

Senator SYMINGTON. After you have read it in detail.

Mr. IKLE. Right.

[The information referred to follows:]

DR. IKLE'S REACTION TO FORMER PRESIDENT NIXON'S STATEMENT

(Supplied by ACDA)

The Reuters report to which you refer quoted former President Nixon as having said in Peking ". . . that some people naively believe 'that the mere act of signing a statement of principles or a diplomatic conference will bring instant and lasting peace' . . ." (*New York Times*, February 23, 1976).

Mr. Nixon apparently did not make these observations with regard to any particular statement of principle or diplomatic conference.

Senator SYMINGTON. Thank you.

POSSIBILITY OF ACHIEVING MEANINGFUL SALT II AGREEMENT

My next question is, do you believe it is still possible to achieve a meaningful SALT II agreement in the national interest of the United States?

Mr. IKLE. Definitely I do, Mr. Chairman. How soon we can have it is hard to tell. We fortunately still have the interim agreement lasting for more than another 1½ years. Of course, let us not forget about the ABM Treaty, which is an indefinite agreement.

Senator SYMINGTON. I wasn't talking about the ABM Treaty.

Mr. IKLE. I realize that.

Senator SYMINGTON. I was one of the people who voted against the ABM. We lost it on a tie vote because one Senator didn't put his vote where his mouth was. It is now scrapped and has cost the American taxpayer \$10 million. That is not so much money anymore, but it does affect the national debt, as you know.

So I am not talking about the ABM. I am talking about offensive weapons in the future SALT II agreement.

Mr. IKLE. To repeat, we are hoping to achieve an agreement soon. But we do have time available, given that the interim agreement now constrains the arms which would otherwise be increased in numbers until October 1977.

A great deal has already been accomplished in Geneva, particularly on the ballistic missiles, the most dangerous ones from the point of view of surprise attack, as distinct from aerodynamic vehicles.

Senator SYMINGTON. What type of ballistic missiles are you talking about?

Mr. IKLE. I mentioned ballistic as a distinction from aerodynamic; aircraft and cruise missiles and aerodynamic.

DISTINGUISHING BETWEEN BALLISTIC AND CRUISE MISSILES

Senator SYMINGTON. How do you know a cruise missile isn't ballistic?

Mr. IKLE. Here national technical means of verification can tell the difference from the trajectory and other facts. It is my understanding there is no problem of distinguishing between a ballistic missile and a cruise missile. It is conceivable that through concealment measures a country might try to make a ballistic missile look like a cruise missile. That of course points to one of the many verification problems we do have.

Senator SYMINGTON. That is what I was getting at.

TRADING OFF CRUISE MISSILE QUESTIONED

The next question concerns the Backfire. There is some talk about trading the Backfire off for the cruise missile. In my opinion the Backfire is nothing more or less than possibly an improved FB-111. I couldn't envisage trading off the Backfire and saying:

If you don't build any Backfires, we won't build any cruise missiles.

You would agree with that, wouldn't you?

Mr. IKLE. I think there is a great deal of validity in this because the cruise missiles are of many types to assist penetration of air

defenses, which are not limited in SALT. These are tactical and theater functions. Therefore, they have much more variety and different missions contrasted with Backfire.

Senator SYMINGTON. When you say a great deal of validity, do you mean you agree with what I said, that you should not trade off the cruise missile?

Mr. IKLE. A simple tradeoff would not be appropriate.

Senator SYMINGTON. Just as a matter of interest, I wrote the Secretary of State about this matter. I just want you to know I will never agree to trading off an improved middle-range bomber for the cruise missile concept: because in the cruise missile, you have a very large proportion of what you have in the new B-1 bomber and you get it at perhaps one-fiftieth to one-one hundredth of the cost, depending on how it is designed. Would you agree with that?

Mr. IKLE. I couldn't comment directly on these cost issues. It depends, of course, on what you want a bomber such as the B-1 to do, and to what extent aircraft with cruise missiles could be a substitute for that.

There have been a number of interesting studies made of this subject. There is, as you know, considerable disagreement among the experts.

DIFFERENTIATING BETWEEN MISSILES AND WARHEADS

Senator SYMINGTON. My staff tells me I am not clear in what I said. You can tell the difference between the cruise and the ballistic, but you couldn't tell the difference between the cruise missile with a conventional warhead and a cruise missile with a nuclear warhead.

I would add to that, I happen to have been told of experiences with comparing the Skybolt as against the Soviet Amrog, and I would have to be convinced you could tell the whole situation wasn't a straight nuclear job from the standpoint of photography.

And I don't know of any missile that we have ever fired, in spite of the tens of millions if not hundreds of millions of dollars we put into it, I don't know of any nuclear missile that has actually been fired over its range, do you, at any time?

Mr. IKLE. We do not fire our ICBM's from operational sites. The Soviet Union does. On the first point there are degrees of difference. It would be terribly difficult to tell the cruise missile with a conventional warhead from a cruise missile with a nuclear warhead.

It is conceivable that, through deception, a ballistic missile could be made to look like a cruise missile. Maybe at this time it is not a serious problem.

CRUISE MISSILES AS ALTERNATIVE TO MANNED PENETRATION BOMBERS

Senator SYMINGTON. Dr. Ikle, considering arms control and cost effectiveness, what would be the effect of the United States' decision to employ long-range airborne cruise missiles as an alternative to buying these ever more expensive manned penetration bombers?

Mr. IKLE. Studies have been made that tend to show that for certain missions the long-range or medium-range missile, in combination with a cheaper aircraft, could penetrate and thus could serve as a deterrent force.

As I understand it, the argument for a more advanced and hence very expensive aircraft such as a B-1 is that it could do other things that the cruise missile could not.

Senator SYMINGTON. You have over \$100 million in the air in one bomber, so it sure ought to be able to do something the other couldn't do.

Mr. IKLE. That is a good point.

CONTROLS APPLICABLE TO AIRBORNE CRUISE MISSILES

Senator SYMINGTON. What kind of controls could be applied to airborne cruise missiles to preserve the option to employ them in sufficient numbers and with adequate military capability?

Mr. IKLE. The great difficulty here, of course, is the one you have already referred to, Mr. Chairman: the problem of verification, of telling what it is.

That problem is particularly difficult for cruise missiles of short ranges beyond the tactical penetration range, or what some call the medium-range missile.

It is possible that it would be somewhat easier to distinguish cruise missiles of intercontinental range. To the extent that that is true—

Senator SYMINGTON. I am still talking about air-to-ground or air-to-sea missiles.

Mr. IKLE. I see.

POSSIBILITY OF DETECTING TRUE RANGE OF CRUISE MISSILE

Senator SYMINGTON. When the people from the Pentagon come over to one of my committees, and announce their position, we in effect say yes, Lord, and yes, Your Honor, and thank you very much for giving us these instructions.

I don't buy that because I think we are running into a great deal of trouble, not only from the cost effectiveness standpoint, but from the knowledge of people having a right to know about their defenses.

I see a lot of talk about limiting cruise missiles, air-to-ground and air-to-sea—and air-to-ground should never be considered out of the picture—to 375 miles.

How in the name of heaven are you going to be able to tell whether it could go 375 miles or 675 miles just by looking at it?

I take you out and you see an automobile and you say, "How far can it go?" and I say, "600 miles." You buy it and find it only goes 300 miles.

Vice versa, how are you ever going to detect a true range of one of these missiles unless you have onsite inspection?

Mr. IKLE. There is no way to detect the range of a cruise missile, within the potentialities you mentioned, by looking at it. The answer is you cannot, Mr. Chairman.

Senator SYMINGTON. Then a lot of the talk we have heard about these negotiations is pretty theoretical, is it not?

Mr. IKLE. I don't think the administration has come forward with a detailed explanation of what our position is, because the negotiations are still private; there has been a lot of talk in newspapers.

Senator SYMINGTON. These reports come from what is called a high State Department source or a high Government source. They are

printed in a lot of reputable papers, and yet such a position really doesn't seem to add up from the standpoint of practicality.

How are you going to do it? Considering the range limitations, how would you know, for example, that an air-to-sea or air-to-ground missile from a launching platform—and a launching platform can be any kind of an airplane: C5A, 747, 707, B-52; it doesn't have to be a \$100 million bomber, you just have a launching platform—how could you tell that it wouldn't go 800 or 900 miles instead of 300 miles?

I am concerned about this, I have been involved in it for 40 years.

Mr. IKLE. The best assessment that I have seen, on which I base my judgment, indicates that you cannot tell this. Now when you get to different ranges, intercontinental ranges, maybe there is a possibility.

Senator SYMINGTON. Let's talk about the intercontinental range. The theory is this cruise missile can be a few miles under the water; isn't that the idea?

Mr. IKLE. Yes.

Senator SYMINGTON. So what is intercontinental if you were going to have a missile that you launch, say, 500 miles off the coast? Can a submarine go within 500 miles of a coast?

Mr. IKLE. There are known deployments of submarines off our coasts and off other coasts within that range.

Senator SYMINGTON. I am getting into sea missiles now. This is my next subject.

You could launch one of these from under the water if necessary, could you not?

Mr. IKLE. That is right.

AGREEMENT BASED ON CERTAINTY NOT GOOD FAITH SUGGESTED

Senator SYMINGTON. So what worries me is we are wandering around in sort of a fairy tale concept of national security. I want to see a SALT agreement more than anything else in the world. But I don't want to see an agreement that is built on false premises.

I don't think any country has permanent friends or permanent enemies. It just has permanent interests. We talk about the way we are going to handle this situation. Who were our greatest enemies in World War II? Germany and Japan, weren't they?

Mr. IKLE. Right.

Senator SYMINGTON. Who were two of our best friends? China and Russia, weren't they?

Mr. IKLE. Yes.

Senator SYMINGTON. So these things shift, and if we are going to make some kind of deal, wouldn't you agree we should not do it on the basis of good faith, we should do it on the basis of certainty.

Mr. IKLE. We do want to be able to verify any important limitation we impose. I also agree with you very much, Mr. Chairman. Particularly in arms control you have to take a long-term point of view. These treaties are with us for a long time. They take a long time to negotiate. So you have to look 10, 20 years ahead. This consideration is very much in the spirit of the remark you just made.

DETERMINING RANGE OF CRUISE MISSILES

Senator SYMINGTON. Let's go back. I was involved with the Skybolt missile which, unfortunately, in my opinion, was canceled. It had a range of roughly a thousand miles.

We also had the Hound Dog which had a range of about 500 miles. The big difference was the Skybolt was ballistic.

How are you going to tell if you make a deal at 375 miles, if a possible enemy's airplane doesn't have a missile that will go 1,000 miles instead of 375 miles? And 1,000 miles is an intercontinental bomber. If it could be within 1,000 miles of the launch platform, it can go within 1,000 miles of the coast.

I think all the people in not only this country but other countries are being so terribly misled by the way we are chattering.

A high Government official in December 1972 said, "we are 90 percent in agreement with Hanoi on the war."

A few days later we found out from Hanoi that we were doing the most intensive bombing in the history of the world, that so-called carpet bombing by B-52s.

So, how are you going to tell whether these missiles off the launch platforms 1,000 miles away can go 375 miles or 1,375 miles unless you have some onsite inspection?

Mr. IKLE. Mr. Chairman, once we have an agreement that has provisions on cruise missiles that has particular limitations, whatever these may be, I think it is essential we fully explain these, obviously, to Congress and to the public.

Senator SYMINGTON. What agreement will there be to control the range?

Mr. IKLE. That we explain whatever the limitations are. We don't have an agreement now on these issues. Whatever the limitations are, we must explain how we can verify them. If we cannot verify them, we must explain why this is tolerable.

Senator SYMINGTON. Nobody on the joint committee staff, or the experts, has ever told me how you could gage the range.

Mr. IKLE. On this question of telling a 375-mile range from, say—
Senator SYMINGTON. Or 600.

Mr. IKLE. Say a 600-mile range, I repeat again that you cannot tell this difference from looking at the missile.

Senator SYMINGTON. How would you tell it, then?

Mr. IKLE. There is a question whether you can tell it at all. It is for that reason that the proposal of using that low limit across the board gives us great difficulties.

Senator SYMINGTON. I am awfully anxious to see an arrangement made which would protect my children and their children. But I am beginning to believe this whole SALT situation is a fraud. It is not only a fraud to the other countries of the world that are operating without any supervision from us in the plutonium proliferation field, but it is a fraud to the American people, unless we have some clear idea as to just what it is we are doing.

NECESSITY OF ONSITE INSPECTION TO DETERMINE MISSILE RANGES

I am glad to hear you say that there is no way of deciding what the range will be. If you can't decide what the range will be, how are you going to have any agreement that means anything about air-to-ground or air-to-sea cruise missiles?

Mr. IKLE. I think, Mr. Chairman, if you can step back a little bit to look at the larger picture, the larger picture has to do with ballistic missiles that can travel in 30 minutes or so from continent to continent. Then they have the risk of surprise attack.

With respect to the ballistic missile, national technical means of verification provide ways of determining things about the range, about the MIRVing and so on, that we do not have for cruise missiles. Thus, there is a line of hope here that on the ballistic missiles where we have reached a large measure of agreement based on the deal, that something can be done more easily on, I think, the proliferation question of cruise missiles.

Senator SYMINGTON. If you want to get down into it, I understand over 50 percent of the people of the United States live within 100 miles of a coastline. You can fire a ballistic missile from under the water and on the surface from an airplane and that has nothing to do with cruise missiles.

On the other hand, I understand that it is very difficult to decide whether a missile is a cruise missile with a nuclear warhead or a cruise missile without a nuclear warhead.

Inasmuch as it can operate 50 feet above the ground and be designed to follow the contour of hills and so forth, we are really talking about something that is awfully theoretical unless we have onsite inspection. Would you agree to that?

Mr. IKLE. If you try to get low limits on these types of missiles, yes, sir. However, cruise missiles do not travel at the speed of ballistic missiles, but they take hours to reach their targets, if they travel more than a few hundred miles. Therefore, we would have advance warning. Therefore, they are less suitable for a surprise attack.

Senator SYMINGTON. Subsonically a cruise missile can go 600 or 650 miles an hour. If it goes 600 miles, it is not going to take hours to get there, at 650 miles an hour.

Mr. IKLE. Still, you would have a warning of their approach and also from their deployment. If there are many such missiles deployed, you would have been warned. Warning could be used to partially alert the forces. This is where the bombers force comes in.

REALISM OF U.S. POSITION QUESTIONED

Senator SYMINGTON. I want to get this stuff out. We have heard a lot about the Cubans in Angola and are worried about these Cubans in Angola. Sometimes I worry about the Cubans in Cuba.

You have only 90 miles between the United States and Cuba. And three motorboats of the *Komer* class, as proved by the *Elath* episode some years ago in the Mediterranean, could destroy the whole coast of Florida.

It seems to me we are very theoretical in our efforts to prove we are reaching some form of agreement with our possible chief adversary.

Do you know the coast of Florida?

Mr. IKLE. Yes.

Senator SYMINGTON. Sometimes it gets pretty foggy, doesn't it?

Mr. IKLE. Yes.

Senator SYMINGTON. If a missile can travel at 20 feet over the water, you wouldn't know if it had a nuclear warhead or not, would you?

Mr. IKLE. In the last analysis, Mr. Chairman, it gets back to something you have mentioned many times. You can deliver nuclear weapons in a suitcase.

Senator SYMINGTON. I am talking about all that high-class talk in the papers that we are almost ready to reach an agreement on offensive cruise missiles by trading off the Backfire.

We are really not being very realistic, do you think? I have no sympathy with former President Nixon attacking President Ford's position, which was the implication in the paper today. But I do think here is some merit in it, that if you just sign a piece of paper with these people, it doesn't mean too much.

Wouldn't you agree with that?

Mr. IKLE. We want arms limitation agreements we reach with our adversaries to have great viability. Therefore; we don't want to rely on trust.

Senator SYMINGTON. We are covering a lot of ground here this morning. I appreciate very much what you say about air-to-sea or air-to-ground missiles.

CONTROLS CONCERNING SEA-LAUNCH CRUISE MISSILES

Let's talk about sea-launch cruise missiles. They can be launched from a surface of a ship or submarine, correct?

Mr. IKLE. Right.

Senator SYMINGTON. Are there controls on the deployment of long-range sea cruise missiles which would be in the national interest of the United States; and in that connection again, how can you control the range?

Mr. IKLE. This again leads back to my earlier answer which was tentative because these are highly technical issues; that when you get into very long ranges, you may be able to tell just from the size and shape of the missile, much as you can tell from an aircraft, whether it is a very short range aircraft or a very long range one.

On the other hand, if you want to make distinctions at these lower ranges you mentioned, Mr. Chairman, then the verification is difficult, indeed.

Senator SYMINGTON. On ballistic missiles also, isn't it theoretical as to how many individual weapons are in the tip of a MIRV warhead, whether you have 5, 10, or 15?

Mr. IKLE. We do not envisage an agreed limitation as to how many warheads there would be on a MIRV warhead.

Senator SYMINGTON. If that is true, then—I am thinking of working into an agreement which I am very anxious about, as I think you know.

Mr. IKLE. Right.

Senator SYMINGTON. One submarine could destroy all of the towns, say, over 100,000 without any problem at all in Florida with a MIRV missile, couldn't it?

Mr. IKLE. You wouldn't even need a MIRV missile for that. It could be done by aircraft.

Senator SYMINGTON. We are talking about the grave new world of the cruise missile. I know a lot of other ways you can do it. You could walk into a hotel with suitcases in each hand. Certainly that city would be dead if you left both suitcases in the room. I am not talking about that.

I am talking about the big issue of controlling offensive cruise missiles. Actually, we could have a cruise missile that was subsonic, and we could have 10 or 15 MIRV nuclear warheads on it, could you not?

Mr. IKLE. I think the idea has been mentioned before of putting multiple warheads on cruise missiles. To my knowledge, this is not an important thought at this time, the MIRV'ing of cruise missiles.

At any rate, you are right in the rest of what you emphasize, that just to do damage and destruction, the cruise missile can go a long way and it is very hard to control that.

Senator SYMINGTON. For 25 years I have tried to get the Air Force interested in a mobile ICBM, or IRBM—whichever way you want to look at it. Its distances can always be adjusted.

Now I understand the Soviets don't want to talk about mobilized ICBM's; is that right?

MOBILE ICBM'S

Mr. IKLE. There is a question as to whether mobile ICBM's should be prohibited altogether, or should be counted under the ceiling. The argument for prohibition is that it would make verification easier if you have none at all. The argument for permitting and thus limiting mobile ICBM's is that they give you a less vulnerable way of basing your totalitarian forces.

Senator SYMINGTON. I would like to have another hearing sometime on mobilized ICBM's. The situation of the ICBM's fundamentally leaves out the vital aspect of it, which is PSI (pounds per square inch).

With that premise, I wonder why we didn't get into it. The Soviets from what I hear, are pretty deep in it. No doubt if they are, some other countries are getting into it pretty extensively, too.

MONITORING OF LONG-RANGE SEA-LAUNCHED CRUISE MISSILE CONTROL

To what extent could controls on long-range sea-launched cruise missiles be monitored to the present and anticipated national means of verification?

Mr. IKLE. I think this gets us back to the question we turned over before. I would say, for a detailed, technical assessment, we would obviously get into intelligence aspects and that would have to be in a private session.

Senator SYMINGTON. Did you see the article in the February 6 issue of the Los Angeles Times?

Mr. IKLE. Yes; I have, Mr. Chairman.

Senator SYMINGTON. Do you agree with the basic thesis, that although the cruise missile presents a verification problem, it is cost effective.

Mr. IKLE. I think from all of the remarks I made this morning I would certainly agree that there is an enormous verification problem

For some types of limitations, verification may not be possible. Also, it is possible that the cruise missile may be a much cheaper way of accomplishing certain types of missions.

SOVIET CRUISE MISSILES

Senator SYMINGTON. The author, Ernest Conine, cites three facts about Soviet cruise missiles. Fact one is that it is already too late to head off a Russian cruise missile. He cites the employment of the Shaddock and development of the SSX-12. Do you agree?

Mr. IKLE. There were cruise missiles in existence from the 1960's on the Soviet side. And to that extent you could not abolish the cruise missile without abolishing Soviet cruise missiles.

Of course, the technology has been developed, as you mentioned yourself. We had the Hound Dog as a cruise missile.

Senator SYMINGTON. This is the kind of thing that worries me, that some people say we are so far ahead of the Soviets in cruise missile technology; we could reach an agreement.

But it is true that many years ago, the Israeli destroyer, *Elath*, was destroyed by two Soviet cruise missiles. One hit it so it couldn't go forward and the second sank it. Isn't that correct? Those were cruise missiles, weren't they?

Mr. IKLE. I do not remember the details of that.

Senator SYMINGTON. I do. It came off a Soviet designed, large motor boat, *Komer* class. The Israelis didn't know what hit their ship the first time. The second time they saw it coming, but they couldn't do anything about it because they were helpless, you might say, in the water at that point.

So the Soviets have been working on cruise missiles for some time, have they not?

Mr. IKLE. As I understand it, the point we are discussing relates to guidance for medium- and long-range cruise missiles, not the very existence or the propulsion of the cruise missiles in which indeed the Soviets have been doing things for the last decade.

Senator SYMINGTON. Don't misunderstand me. I am all for making an arrangement, but I want to make one that is a real one. I don't want to say we are 99 percent home with our agreement with Hanoi and find we are bombing Hanoi a few days later.

We might have said we were killing 99 percent of the North Vietnamese, and that is why we are 99 percent reaching an agreement.

So I think that there is an awful lot of mystic talk going around about this. My staff and I through three committees have been doing our best to understand it. That is why we were so anxious to have you come up and tell us about your own experience.

ACDA PUBLICATIONS CONCERNING ARMS CONTROL

May I say, I have the greatest respect for the work you have been doing in this field. I think that pamphlet you put out—what was the name of it?

Mr. IKLE. Arms Control and National Security, I believe.

Senator SYMINGTON. The one that gave 13 kiloton and 58 megaton figures.

Mr. IKLE. We have issued a number of publications. We could provide you with a list of them, Mr. Chairman.

Senator SYMINGTON. Would you supply the titles for the record?

Mr. IKLE. Certainly, and we will give you a short list of the available publications.

[The information referred to follows:]

ACDA PUBLICATIONS

(Supplied by ACDA)

The name of the ACDA pamphlet to which you refer is *Worldwide Effects of Nuclear War . . . Some Perspectives* (1975).

The titles of other Agency publications currently in print are attached.

OFFICIAL PUBLICATIONS OF THE U.S. ARMS CONTROL AND DISARMAMENT AGENCY

ACDA ANNUAL REPORT

- First Annual Report to Congress.* 1962. 31 p.
Second Annual Report to Congress. ACDA Publication 14, 193. 106 p.
Third Annual Report to Congress. ACDA Publication 20, 1964. 52 p.
Fourth Annual Report to Congress. ACDA Publication 25, 1965. 48 p.
Fifth Annual Report to Congress. ACDA Publication 31, 1966. 57 p.
Sixth Annual Report to Congress. ACDA Publication 37, 1967. 72 p.
Seventh Annual Report to Congress. ACDA Publication 45, 1968. 77 p.
Eighth Annual Report to Congress. ACDA Publication 51, 1969. 78 p.
Ninth Annual Report to Congress. ACDA Publication 57, 1971, 54 p. Available from GPO at \$0.35.
Eleventh Annual Report to Congress. ACDA Publication 61, 1972. 66 p.
Twelfth Annual Report to Congress. ACDA Publication 67, 1973. 71 p. Available from ACDA at no charge.
Thirteenth Annual Report to Congress. 1974. 56 p.
Fourteenth Annual Report to Congress. 1975. 77 p.
Agenda Item—Peace. ACDA Publication 23, 1964. An explanation of President Johnson's proposals to the ENDC at Geneva. 30 p.
Arms Control Achievements, 1959–1972. ACDA Publication 63. Second Edition, 1972. 18 p.
Arms Control and Disarmament. ACDA Publication 11, 1963. A transcript of the educational television program "State Department Briefing: Disarmament." 38 p.
Arms Control and Disarmament Agreements, 1959–1972. ACDA Publication 62, 1972. 119 p. Available from GPO at \$0.60.
Arms Control and Disarmament Agreements: Text and History of Negotiations. (Revision of ACDA Publication 62.) ACDA Publication 77, 1975. 159 p. Available from GPO at \$1.80.
Arms Control and National Security. ACDA Publication 49, 1970. Revised Edition, 33 p.
Arms Control: Moving Toward World Security. ACDA Publication 82, 1975. 18 p. Available from ACDA at no charge.
Arms Limitation Agreements—July 1974 Summit. ACDA Publication 73, 1974. 8 p. Available from ACDA at no charge.
A Brief Bibliography: Arms Control and Disarmament. ACDA Publication 22, 1964. 33 p.
Current Negotiations on Arms Limitations. ACDA Publication 72, 1974. 4 p.
The Danger of Nuclear Proliferation. ACDA Publication 75, 1974. 7 p. Available from ACDA at no charge.
Disarmament: The Continuing Search. ACDA Publication 7, 1962. Article based on an address delivered by former ACDA Director William C. Foster at Cornell University. 10 p.
Disarmament: The New U.S. Initiative. ACDA Publication 8, 1962. A compilation of six speeches by prominent Americans. 71 p.
Disarmament: Two Approaches. ACDA Publication 1, 1962. A tabular comparison of the U.S. proposal of September 25, 1961, and the Soviet proposal of September 23, 1960. 24 p.

DOCUMENTS ON DISARMAMENT

1945-1959. Two volumes. State Department Publication 7008, 1960. 1,680 p.

1960. State Department Publication 7172, 1961. 431 p.

1961. ACDA Publication 5, 1962. 813 p.

1962. ACDA Publication 19, 1963. Two volumes. 1,385 p. Available from ACDA at \$3.75.

1963. ACDA Publication 24, 1964. 754 p.

1964. ACDA Publication 27, 1965. 611 p. Available from GPO at \$1.50.

1965. ACDA Publication 34, 1966. 722 p. Available from GPO at \$2.00.

1966. ACDA Publication 43, 1967. 917 p. Available from ACDA at \$2.50.

1967. ACDA Publication 46, 1968. 836 p. Available from GPO at \$2.50.

1968. ACDA Publication 52, 1969. 908 p. Available from GPO at \$3.75.

1969. ACDA Publication 55, 1970. 838 p. Available from GPO at \$3.50.

1970. ACDA Publication 60, 1971. 826 p. Available from GPO at \$3.50.

1971. ACDA Publication 66, 1972. 1,012 p. Available from GPO at \$6.00.

1972. ACDA Publication 69, 1974. 974 p. Available from GPO at \$7.40.

1973. ACDA Publication 76, 1975. 993 p. Available from GPO at \$8.90.

The Economic and Social Consequences of Disarmament. ACDA Publication 21, 1964. (Supersedes Publication 2) U.S. reply to the inquiry of the Secretary-General of the United Nations. 47 p.

The Economic Impact of Reductions in Defense Spending. ACDA Publication 64, 1972. 31 p. Available from ACDA at no charge.

Environmental Warfare Questions and Answers. ACDA Publication 83, 1975. 10 p. Available for ACDA at no charge.

Explanatory Remarks About the Draft Non-Proliferation Treaty. ACDA Publication 47, 1968. 19 p. Available from ACDA at no charge.

Geneva Conference on the Discontinuance of Nuclear Weapon Tests: History and Analysis of Negotiations. State Department Publication 7258, 1961. Historical analysis of the test-ban negotiations to 9/61, with documents. 641 p.

International Negotiations on Ending Nuclear Weapons Tests, September 1961-September 1962. ACDA Publication 9, 1962. A chronicle of the 1961-1962 test-ban negotiations, with selected documents. 343 p. Available from ACDA at \$6.00.

International Negotiations on the Biological-Weapons and Toxin Convention. ACDA Publication 78, 1975. 334 p. \$6.00.

International Negotiations on the Scabed Arms Control Treaty. ACDA Publication 68, 1973. 228 p. Available from ACDA at \$4.00.

International Negotiations on the Treaty of the Non-Proliferation of Nuclear Weapons. ACDA Publication 48, 1969. 183 p. Available from GPO at \$1.00.

The International Transfer of Conventional Arms. 1973, 205 p. Available from ACDA at \$4.00.

Nonproliferation Treaty Review Conference. ACDA Publication 79, 1975. 7 p. Available from ACDA at no charge.

Non-Proliferation Treaty, Why? ACDA Publication 44, 1968. 10 p. Available from ACDA at no charge.

Nuclear Proliferation: Questions and Answers. ACDA Publication 80, 1975. 24 p. Available from GPO at \$0.45.

Nuclear Testing and Disarmament. ACDA Publication 3, 1962. Text of President Kennedy's radio-television address of March 2, 1962. 20 p.

Outline of Basic Provisions of a Treaty of General and Complete Disarmament in a Peaceful World. ACDA Publication 4, 1965. 25 p. Available from ACDA at no charge.

Review of International Negotiations on Cessation of Nuclear Weapons Tests, September 1962-September 1965. ACDA Publication 32, 1966. The third volume of a series of historical reviews of the test-ban negotiations, covering the period in which the treaty was signed. 103 p. Available from GPO at \$0.40.

Risk and Security in the Age of Nuclear Weapons. ACDA Publication 12, 1963. An address by Former ACDA Director William C. Foster before the University of Michigan and Bendix Corp. Arms Control Symposium. 17 p.

SALT Lexicon. Revised Edition. ACDA Publication 71, 1975, 23 p. Available from ACDA at no charge.

A Step Toward Peace. ACDA Publication 16, 1963. President Kennedy's radio-television report to the people on the nuclear test-ban treaty. July 26, 1963. 20 p.

Test Ban Treaty: Questions and Answers. ACDA Publication 18, 1965. Approximately two dozen questions and answers on the test-ban treaty. Text of the treaty with brief historical notes. 24 p.

To Prevent the Spread of Nuclear Weapons. ACDA Publication 26, 1965. Draft treaty to prevent the spread of nuclear weapons tabled by the U.S. on August 17, 1965 at Geneva together with statements expounding it. 16 p.

Toward a Strategy of Peace. ACDA Publication 17, 1963. President Kennedy's address at commencement exercises at American University, Washington, D.C., June 10, 1963. 17 p.

Toward a World Without War. ACDA Publication 10, 1962. A summary of U.S. disarmament efforts. 28 p.

Why a Nuclear Test Ban Treaty? ACDA Publication 15, 1963. Position on a nuclear test-ban primarily as presented in testimony before Congress. 46 p.

World Military Expenditures, 1969. ACDA Publication 53, 1969. 26 p.

World Military Expenditures, 1970. ACDA Publication 58, 1970. 37 p. Available from GPO at \$0.65.

World Military Expenditures, 1971. ACDA Publication 65, 1972. 59 p. Available from GPO at \$1.25.

World Military Expenditures and Arms Trade, 1963-1973. ACDA Publication 74, 1975. 123 p. Available from GPO at \$2.00.

Worldwide Effects of Nuclear War . . . Some Perspectives. ACDA Publication 81, 1975. 24 p. Available from ACDA at no charge.

You and ACDA. ACDA Publication 70, 1973. 28 p. Available from ACDA at no charge.

TOO LATE TO HEAD OFF RUSSIAN CRUISE MISSILE?

Senator SYMINGTON. Just to be sure I understood, do you agree with the author of this article that it is already too late to head off the Russian cruise missile?

Mr. IKLE. The Russian cruise missiles do exist and, thus, an agreement wouldn't erase the past, unless they were willing to dismantle those. In that sense it is certainly correct.

The question is what one can do about future types of cruise missiles. There, of course, the verification problem we discussed earlier is a big hurdle.

Senator SYMINGTON. Of course, this is of great interest to our allies our friends in NATO. We went through that last summer.

USES AND COST OF CRUISE MISSILE

This article continues:

The cruise missile, despite the arms control problem it creates, could make Armageddon likely, being too slow for surprise attack because there is no ballistic aspect to it.

Then it continues:

On long ranges, therefore, it would be useful as a defensive or retaliatory weapon. Beyond that, remarkable accuracy means conventional warheads would be used to destroy targets that otherwise would require nuclear weapons.

This is good news for the people near ground zero. It also means that NATO could respond to Soviet encroachment in Western Europe, for example, without necessarily setting off a nuclear holocaust.

Do you agree with that observation?

Mr. IKLE. There is a great deal of uncertainty as to how these things will work. He seems to be talking here about advanced guidance, which indeed may bring this accuracy. The question is, at what cost?

Sometimes we have discovered that certain weapon systems cost less than we thought. I think the Minuteman is a case in point. In other instances we have discovered that they cost much more than we thought.

I think we have a range of uncertainty. If things work out on the prices people anticipate and on their accuracy, it is possible that cruise missiles could deliver conventional warheads, but we do not know yet

Senator SYMINGTON. Apparently this man has done his homework. He says that cruise missiles promise to be incredibly cheap—only a fraction as much of the land or sea-launch ICBM's.

Military service is, of course, using more cruise missiles in addition to their other weapons. But there is no reason they cannot be substituted to a considerable degree for a far more costly weapons system.

Would you agree to that?

Mr. IKLE. I think I probably already answered this. I am very hesitant to make firm predictions about the cost of future weapon systems. We have learned that this is a very uncertain art.

PERSONS TO WHOM DR. IKLE REPORTS

Senator SYMINGTON. Dr. Ikle, you know you are up here and we want your personal opinion on these matters. Who do you report to?

Mr. IKLE. I report to the President and to the Secretary of State.

Senator SYMINGTON. Which one do you report to? They are not the same person.

Mr. IKLE. To the President and Secretary of State. For negotiations I work under the direction of the Secretary of State. I make policy recommendations both to the President and to the Secretary of State.

Of course, I am also in touch with my colleagues in ERDA, the Department of Defense, and so on, depending on the issue.

Senator SYMINGTON. At this point would you file for the record an organization chart?

Mr. IKLE. Certainly.

Senator SYMINGTON. It seems to me all a man has to know—I was in this business a few years myself—is who reports to whom, to whom does he report, and what is he supposed to do.

As I get your answer, you are misty about who you report to. If you give us an organization chart, maybe we can clear that up.

Mr. IKLE. I would propose we insert that part of the Statute of the Arms Control and Disarmament Agency which specifies the responsibility of the Director of the Agency.

Senator SYMINGTON. I would be glad to read that. Would you give us a chart, too?

Mr. IKLE. We will provide a chart, too.

Senator SYMINGTON. I would appreciate that.

[The information referred to follows:]

RESPONSIBILITIES AND REPORTING RELATIONSHIPS OF ACDA DIRECTOR

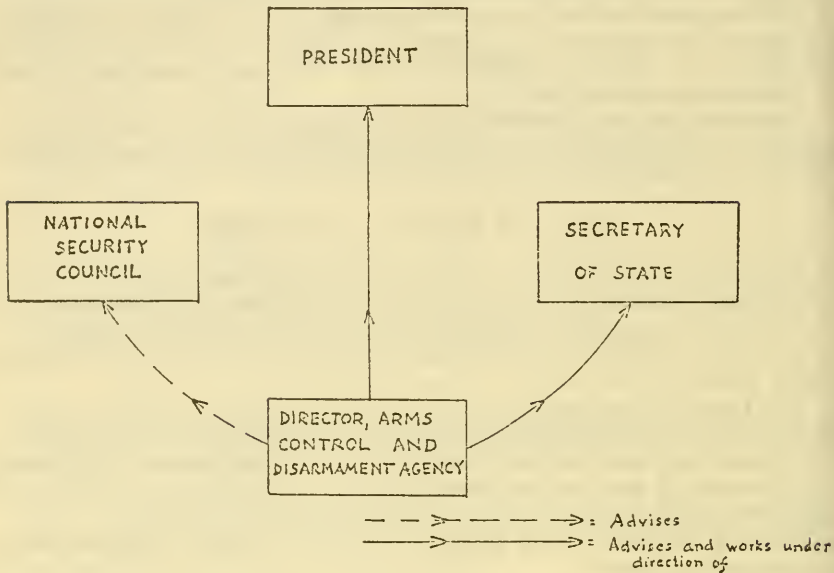
(Supplied by ACDA)

The Arms Control and Disarmament Act, as amended, provides in pertinent part that the Director ". . . shall serve as the principal adviser to the Secretary of State, the National Security Council, and the President on arms control and disarmament matters. In carrying out his duties under this Act the Director shall, under the direction of the Secretary of State, have primary responsibility within the Government for arms control and disarmament matters, . . ." (22 U.S.C. § 2562).

The Act further provides that the Director ". . . is authorized and directed, under the direction of the President, (1) to insure the conduct of research, development, and other studies in the field of arms control and disarmament: . . ." (22 U.S.C. § 2571).

These relationships are illustrated by the attached chart, as requested.

ACDA REPORTING RELATIONSHIPS



PNE AGREEMENT AND THRESHOLD TEST BAN

Senator SYMINGTON. Now we get to the test ban situation. Former President Nixon and Secretary General Brezhnev agreed in June 1974 upon a Limited Test Ban Treaty to go into effect on March 31, 1976. That is getting pretty close. The limited ban was subject to agreement on controlling peaceful nuclear explosions. This is little more than a month away. What is the status of that now?

Mr. IKLE. We are now negotiating in Moscow and completing the agreement on peaceful nuclear explosions. We have made good progress, but the agreement is not yet final.

It is our view that these two agreements have to move together, because one without the other doesn't make much sense. We therefore have not yet submitted to the Senate for its consent to ratification the threshold test ban treaty that covers weapons tests.

Senator SYMINGTON. Name for me again the two that should go together.

Mr. IKLE. The agreement that was completed in 1974 covering weapons tests, the Threshold Test Ban Treaty, and the one that was not completed at that time and on which we are still negotiating, the agreement covering peaceful nuclear explosions.

Senator SYMINGTON. Didn't we reach some agreement on 150 kilotons?

Mr. IKLE. The agreement on weapons tests has a limit of 150 kilotons, yes, sir.

Senator SYMINGTON. Do you think we should extend that further?

Mr. IKLE. We now have to complete the complementary prohibitions on peaceful explosions.

COMPREHENSIVE TEST BAN

Senator SYMINGTON. Do you believe a comprehensive test ban would be in the national interest of this country and other countries?

Mr. IKLE. If you can get a verifiable comprehensive test ban, it could certainly be in the national interest, and we are for it.

One of the big problems there, Mr. Chairman, is the fact some countries argue that they are interested in peaceful nuclear explosions. There is no way we now know how to separate such explosions from a comprehensive test ban.

Senator SYMINGTON. Thank you. You have been very considerate and patient. I appreciate it. We are just trying to get the facts. It is very hard to get them.

PAKISTAN'S INTEREST IN NUCLEAR MATERIALS REPROCESSING CENTER

The last point I want to bring up is proliferation. We understand Pakistan has been seeking a nuclear materials reprocessing center. Why do you think Pakistan wants this?

Mr. IKLE. I think this is a very serious and important question, Mr. Chairman. Pakistan could not want such a plant for economic reasons. There is no economic justification at all for it.

They have a relatively small Canadian reactor, a CANDU, for which reprocessing doesn't make sense now. Canada may not consider doing reprocessing for their reactors until the year 2000. Pakistan has only a very small one of those.

If they get some other reactors, one or two additional ones, reprocessing still would be 10, 15 years away. The economics would be such that a national reprocessing plant would not at all be warranted.

Nor is there a justification for technical training based upon the legitimate need for such training that Pakistan may have in order to maintain its nuclear power reactor. But it is not training in the reprocessing plant technology but training in nuclear reactor maintenance, which is needed by Pakistan.

So we have to ask ourselves, what is the reason here, Mr. Chairman. I think the reason is what you may call the iron law of proliferation.

If one country confronting a principal adversary proceeds to develop nuclear explosives, that principal adversary will try to do the same, unless protected by a firm alliance with a nuclear power.

In short, in my view, the reason for the Pakistan interest in the reprocessing plant is that the Indians developed nuclear explosives. I think this is a stark object lesson of why it is in the self-interest of other countries to support the nonproliferation effort.

Senator SYMINGTON. I remember the little problem we came out with in sort of tilting towards Pakistan. Do we have any tilt expressed or implied in this situation?

Mr. IKLE. I don't see this as a problem in our relationship of moving towards one or the other of these two countries.

I think this is a problem of the interaction between these neighboring countries. This worldwide is a phenomenon that you have where, in neighboring countries between which exist some problems or antagonisms, one moves to create nuclear power the other will try to follow.

GERMAN ARRANGEMENT WITH BRAZIL

Senator SYMINGTON. Going back a bit, one thing that has worried us is this problem of nuclear technology sales. We brought up with the State Department the German arrangement with Brazil, which gave them an entire enrichment process, as you know.

The State Department testified to us on the Foreign Relations Committee that they did their best to stop it. But the Chancellor of Germany, Dr. Schmidt, said he hadn't had a single complaint from anybody. Someone was not stating it accurately.

Do you know if in this trip—I see Secretary Kissinger was just in Brazil—do you know if this subject has come up there? Did they ask you to prepare anything to discuss this matter down there when it came up? Because I think it could be as serious as anything in the world today from the standpoint of the world's future.

Mr. IKLE. Mr. Chairman, I have not seen the reports yet from the visit to Brazil of the Secretary.

Senator SYMINGTON. Were you asked anything about it? You are the head of this Department.

Mr. IKLE. We made an input to the briefing book on this question, yes.

Senator SYMINGTON. Before the trip was made?

Mr. IKLE. Before the trip.

Senator SYMINGTON. But you don't know what happened on the trip?

Mr. IKLE. I have not yet had a chance to read the report, since he just visited there before the weekend.

POSSIBILITY OF FRENCH SALE TO SOUTH KOREA

Senator SYMINGTON. Now on this South Korean decision not to buy a reprocessing plant like the Brazilians did from Germany, we understand France was willing to sell them one. Is it definite they are not going to have one?

Mr. IKLE. There were reports that there was South Korean interest in acquiring a French reprocessing plant. Now we are given to understand that South Korea has decided not to go ahead with the acquisition of such a plant.

This I think is a very wise decision because the economics again, would not have warranted the plant. And given our close alliance relationship, this decision helps stability and should help our support.

Senator SYMINGTON. I hope we had something to do with that. As a matter of fact, except for South Vietnam and not counting any of our military force in South Vietnam, we have given more aid to South Korea than we have to any other country in the world—more than to France or India or Great Britain. So we ought to have a little leverage there.

Are we pretty sure that the South Koreans are not going through with the French deal?

Mr. IKLE. We feel confident now that they have decided it would be wise not to go ahead with this. Our close alliance relationship, of course, is an important consideration for both of us, both sides.

Senator SYMINGTON. Were you in the negotiations with those countries that met for that secret negotiations in London?

Mr. IKLE. We are constantly involved in these negotiations, we in the Arms Control Agency.

Senator SYMINGTON. Were you there physically?

Mr. IKLE. No. Mr. Van Doren here to my right was involved.

Senator SYMINGTON. Were you in the meeting yourself?

Mr. VAN DOREN. Yes, sir.

Senator SYMINGTON. Did the question of whether France was going to do this, Mr. Van Doren, come up?

Mr. VAN DOREN. Sir, we were aware of the proposed French transaction.

Senator SYMINGTON. I asked you whether it came up in the meeting.

Mr. VAN DOREN. In preliminary discussions relating to those meetings, yes. But not at the meetings themselves.

Senator SYMINGTON. Why not at the meetings themselves?

Mr. IKLE. Mr. Chairman, what we have here is many bilateral consultations with the main nuclear industrial countries: Canada, France, West Germany, the Soviet Union and others.

We have had consultations in Vienna, and then we also have had talks among the group of suppliers that we discussed earlier, which Mr. Van Doren participated in. Some of the subjects are more effectively handled in bilateral or trilateral discussions. Others are best handled in multilateral discussions.

DISCUSSION OF PROLIFERATION AT MARTINIQUE SUMMIT MEETING

The subject of proliferation, for example, was taken up at the highest level of the Martinique summit meeting.

Senator SYMINGTON. Were you there?

Mr. IKLE. No; I was not.

Senator SYMINGTON. How could it be the highest level, if you are head of the agency and you weren't there?

Mr. IKLE. There is a higher level. President Ford and President Giscard d'Estaing were there.

Senator SYMINGTON. They discussed it there?

Mr. IKLE. Yes.

Senator SYMINGTON. Do you know if they kept minutes of that, what they said?

Mr. IKLE. I have gotten a report on it. The subject was discussed. It is also referred to in the communique.

Senator SYMINGTON. Which subject was discussed?

Mr. IKLE. Proliferation.

Senator SYMINGTON. The question of nuclear proliferation in general?

Mr. IKLE. Yes.

Senator SYMINGTON. Everybody discusses that.

Mr. IKLE. I think, unhappily, it cannot be taken for granted. Some countries that take a public position in favor of nonproliferation do not support nonproliferation in private diplomatic discussions.

Senator SYMINGTON. This worries me. The other day before the Joint Atomic Energy Committee we had three, and they seemed dedicated and sincere, men from the General Electric Co. who were giving up their life's work. One of them worked with GE for 23 years, one for 16 years, and one for 12 years.

They all had retirement plans. They were all scientists. They felt that because of the way some of these nuclear plants were built, that they were not safe and, therefore, they left their company in protest.

This afternoon the Joint Committee is going to have more hearings on this and hear from those who believe that they are safe. And then there will be some decision made by somebody; the Congress probably will get into it, including the Joint Committee.

But what we are talking about today is so infinitely more important than what we were talking about in the Joint Committee the other day.

We have a group of countries meeting in secret on this matter, with proliferation going on all over the world. We also know that one of the real troubles in this country today is loss of confidence in the Government, regardless of party, because of excessive secrecy.

I don't see why, therefore, if we are talking with these countries, we can't say what we are talking about. The production of plutonium or uranium or U^{235} is becoming a real nightmare from the standpoint of the world's future. You would agree that it is, wouldn't you?

Mr. IKLE. Certainly.

INTEREST IN ESTABLISHING MULTINATIONAL FUEL CENTERS

Senator SYMINGTON. Another question: Why should countries want to participate now in establishing multinational fuel centers? How much interest in such centers have you been able to detect?

Mr. IKLE. The interest we have been able to discern is rather tentative. One reason why countries should be, and I think will be, interested is economic.

First of all, reprocessing plants are very difficult to operate. The simple object lesson is right here at home. We have a large plant at Barnwell, also completed, which cost, I understand, up to half a billion dollars and which could process the output of some 50 reactors.

No other country has 50 reactors in operation. We are the only country. A country with one or two reactors cannot economically operate a reprocessing plant. That is one main incentive for multinational plants.

Senator SYMINGTON. Are those countries which the U.S. Government suspects of seeking nuclear weapons interested in participating in multinational nuclear centers?

Mr. IKLE. What you have in those countries sometimes are conflicting motivations. There is the motivation of the people concerned with electric power, and so on, to have efficiently operating reactors.

These people can be interested in participating in an economically viable enterprise, such as a large multinational plant.

Now there are also people who want to divert materials for weapons purposes. Of course, they would see no advantage in the multinational plant.

Senator SYMINGTON. Is there any way, if they don't express an interest, that we can—through all the bills we have spread around for aid, grain, and military planes and all—stimulate them into having more interest?

Mr. IKLE. I think it is basically a good idea to enlist our influence to the extent that aid gives this influence in behalf of nonproliferation.

FACILITIES TO BE LOCATED AT MULTINATIONAL NUCLEAR CENTERS

Senator SYMINGTON. What facilities—that is enrichment, fuel enrichment, reprocessing, plutonium storage, waste management reactors—would be located at multinational nuclear centers?

Mr. IKLE. The facilities we would start out with probably would be spent-fuel storage and fuel fabrication. Then we may want to go to reprocessing, but only if and when a real demand is present, since only then would reprocessing make economic sense.

From that point of view of nonproliferation, it would be better if there was no reprocessing facility at all, anywhere.

U.S. ROLE IN ESTABLISHING MULTINATIONAL NUCLEAR CENTERS

Senator SYMINGTON. What role could the United States play in establishing these centers?

Mr. IKLE. We now are helping, Mr. Chairman, with the study in IAEA which will be useful in giving other countries the facts.

We are exploring with industry, as I mentioned before, just what form these centers should take. We are doing legal studies as to the legal framework that would be meaningful and enhance safeguards. Eventually our industrial and commercial community might go into the financing of such centers, if and when they become justifiable.

PRINCIPLES GOVERNING EXPORT OF NUCLEAR POWER STATIONS

Senator SYMINGTON. There was an article in the paper last month saying that the United States and the Soviet Union and five nuclear powers have agreed on principles governing the export of nuclear power stations. "West German Foreign Minister said yesterday under the guidelines, recipients must promise not to use newly acquired know-how to make nuclear weapons."

Do you know anything about that?

Mr. IKLE. This is certainly fully consistent with the restraints and restrictions I mentioned in my opening testimony.

UNILATERAL U.S. MORATORIUM OF NUCLEAR EXPORTS

Senator SYMINGTON. Would you favor a unilateral moratorium on the United States' part on the export of nuclear weapons?

Mr. IKLE. The export of nuclear reactors or weapons?

Senator SYMINGTON. Yes; nuclear exports of any kind.

Mr. IKLE. A unilateral moratorium would not get us what we are trying to get, namely, multinational restraint in spreading nuclear technology. It would simply take us out of the market and out of a position of influence.

But I think we should be driving ahead there and trying to expand and improve existing constraints and existing safeguards.

DR. IKLE'S SUPPORT TO S. CON. RES. 69

Senator SYMINGTON. You are familiar with S. Con. Res. 69, introduced by Senator Cranston and others. On November 5 you supported

that resolution in testimony before the House International Relations Committee.

Have the continuing negotiations on SALT and the reported agreement among nuclear suppliers changed your view in any regard?

Mr. IKLE. No. I see no reason for changing the point I made in my testimony, Mr. Chairman.

INSURING GOOD INTELLIGENCE ON NUCLEAR ACTIVITIES AND DEVELOPMENTS

Senator SYMINGTON. In testimony on the 5th before that committee you said:

There is something else needed to cope with the dangers of nuclear proliferation and to protect our country from nuclear damage. In a world where the destructive potential of the atom has become widely available, this is the requirement for good intelligence.

In view of the recent congressional investigations and the President's intention to reorganize the intelligence community, what actions would you recommend to insure good intelligence on nuclear activities and developments?

Mr. IKLE. First, of course, it is important that there be good congressional support to maintain viable intelligence organizations. This includes support for carefully drafted provisions or legislation to protect the secrecy of intelligence methods and sources.

This relates to the recent proposal made by the President.

In addition, we have to work on our technology, with whatever means are appropriate and consonant with our laws, to help us discover future threats in the nonproliferation area.

My agency is working with the intelligence organizations on this problem, and we want to—

Senator SYMINGTON. You say the intelligence organizations. Do you mean the DIA, the NSA, the CIA, the ONI, the State Department intelligence? What intelligence do you work with?

Mr. IKLE. That is right, these organizations. And there are mechanisms for coordination among these organizations in the area of proliferation.

Senator SYMINGTON. Who do you coordinate with the Committee of 40?

Mr. IKLE. There are special coordinating mechanisms in the proliferation area. There are other mechanisms in the SALT area.

Senator SYMINGTON. I have been on the CIA Intelligence Committee for some 15 years. We have done nothing. One year we didn't even meet once. There was a famous statement made on the floor by the chairman of the Appropriations Committee, who said: "Do you know what they do with the money?" I said: "No; and I don't want to."

That started this thing off. As a result, there has been a very deep investigation under a new committee. There are a lot of ideas as to how it should be set up. I am not clear in my own mind as to how I think it should be set up. I know that in Government if you have any problems, the first thing you do is establish a good many more committees

to handle it, where in business you try to get the committees that were handling it to do the job instead of letting them slough off. I am not saying we should or shouldn't have the new committee.

Who do you deal with in the intelligence field? What agency do you deal with as the Director of Arms Control?

Mr. IKLE. My primary direct contact is with the Director of Central Intelligence.

Senator SYMINGTON. Himself?

Mr. IKLE. Yes.

Senator SYMINGTON. Have you discussed it with Director Bush lately?

Mr. IKLE. Not yet with Director Bush. But I have had many discussions with Director Colby on this subject, and my staff with his staff.

If you wish, Mr. Chairman, I would be pleased to go into this and, indeed, get perhaps your reaction to it and your advice. We have been discussing on the staff level and on my level something like a 10-year plan to do something to meet the needs for intelligence in nonproliferation. I think that our discussion would have to be in an executive or private session.

Senator SYMINGTON. I am very glad to hear that. I am not so much for private sessions. I get tired of reading about them in the press.

I have great hopes for Director Bush. He is a bright new face and knows his way around. I think he does have a feel for this.

Who is the man who is the expert to Colby in this field?

Mr. IKLE. There are a number of people. Mr. Duckett I think would be the one.

Senator SYMINGTON. Carl Duckett is probably the one who knows the most about it?

Mr. IKLE. Yes.

Senator SYMINGTON. You have dealt with him the most?

Mr. IKLE. I have dealt with him a great deal.

Senator SYMINGTON. This has been very interesting. I want to thank you again. You have been cooperative and, in my opinion, there is no position in Government that is more important than the position you hold today to try to stop this proliferation of nuclear weapons.

I thank you very much for coming this morning.

Mr. IKLE. Thank you, Mr. Chairman.

[Whereupon, at 11:45 a.m., the subcommittee adjourned, subject to the call of the Chair.]

[Dr. Ikle's responses to additional questions for the record follow:]

DR. IKLE'S RESPONSES TO ADDITIONAL QUESTIONS OF SENATOR CASE

Question 1. Last year, the Committee on Foreign Relations authorized the spending of up to \$440,000 for research and development work on nuclear safeguards. Please describe what your agency is doing and intends to do in this area.

Answer. The Senate authorization for fiscal year 1976-77 to which you refer was clarified in conference by deleting the words "not to exceed" so as to indicate why an increase of \$440,000 was being authorized but to avoid placing any ceiling on useful research in this vital area. The presently-planned research for fiscal year 1976-77 in this area which actually totals \$1,764,000 is set forth below.

The ACDA external research program for international safeguards, fiscal year 1976, is as follows:

PROJECTS ALREADY IN EFFECT

Enrichment plant safeguards study minor isotopes safeguards techniques (MIST III)-----	\$30,000
Enrichment plant safeguards—technical support-----	70,000
Feasibility study of passive assay techniques for spent high temperature gas-cooled reactors fuel-----	30,403
Feasibility and design for adaption of PATTERN (programmable and tiny transmitting electronic responder) for monitoring nuclear materials-----	15,329
Development of an operational fiber optic safeguards sealing system-----	30,200
Subtotal for projects already in effect-----	175,932

PROJECTS ON WHICH PLANNING IS UNDERWAY

Advanced concepts for international safeguards and physical security-----	\$100,000
Design of a reusable, self-monitoring seal-----	75,000
Technical support to IAEA for international safeguards-----	90,000
Multinational regional nuclear fuel cycle center studies—first phase-----	33,000
Subtotal for projects on which planning is underway-----	298,000

Total projects underway in fiscal year 1976----- 474,000

Approximately one-half of the funds authorized by the Congress in November 1975, to which you refer, will be added to the fiscal year 1976 program as soon as Congress appropriates the funds, as follows:

International cooperation in radioactive waste management-----	\$60,000
Increase in program of technical support for nuclear safeguards-----	35,000
Minor isotope safeguards techniques for chemical reprocessing plants-----	125,000

Total ----- 220,000

The ACDA External Research Program for International Safeguards, fiscal year 1977 is as follows:

Innovative safeguard techniques-----	\$180,000
Uranium enrichment plant safeguards-----	150,000
Nuclear reactor safeguards-----	140,000
Strengthening IAEA safeguard capability-----	200,000
Safeguarding multinational regional reprocessing centers-----	130,000
Remote sensing applied to nuclear non-proliferation-----	50,000

Total ----- 850,000

The second half of the authorization referred to will be added to the fiscal year 1977 program as soon as Congress appropriates the funds, as follows:

Advanced concepts for international safeguards and physical security-----	\$100,000
Safeguards for liquid metal fast breeder reactors-----	120,000

Total ----- 220,000

Grand total ACDA fiscal year 1976-77----- 1,764,000

Question 2. The target date for the proposed TTBT was March 31, 1976. What kind of testing program has the Soviet Union conducted in anticipation of this target date? How about the United States?

Answer. The U.S. has conducted a number of tests above 150 kt in anticipation of the entry into force of the TTBT. The purpose of the AEC/ERDA high-yield test program has been to compress priority high yield testing into a shorter period of time, not to increase high-yield testing. At the same time other testing has been delayed. Overall, the rate of testing carried out by the U.S. since the signing of the TTBT does not vary significantly from the rate of testing in previous years. The U.S.S.R. has also conducted a number of tests above 150 kt since the signing of the TTBT.

Question 3. What will be the practical effect if the proposed TTBT does not go into effect?

Answer. If the TTBT does not go into effect, U.S. political and military interests could be adversely affected in that there would be no treaty constraints

on Soviet testing of high-yield weapons. In particular, there would be no limitation on the development of new high-yield MIRV warheads.

Question 4. If the TTBT is not submitted, should the United States take any further initiatives in regard to a test ban?

Answer. Whether or not the TTBT ever enters into force, the United States Government remains committed to the goal of an adequately verifiable comprehensive test ban treaty. This commitment is explicitly recognized by two important treaties to which the United States Government is a party, the 1963 Limited Test Ban Treaty and the 1970 Nuclear Non-Proliferation Treaty, as well as by the TTBT itself.

Question 5. How could IAEA (International Atomic Energy Agency) be made more effective? Should the United States and the other suppliers play a significant role in getting agreement on these changes?

Answer. The effectiveness of the IAEA can be increased by taking the following measures:

Ensuring adequate financing of Agency safeguard activities, including adequate staffing levels;

Ensure that the Agency receives all necessary support in those areas. The U.S. Government can make useful contributions of gifts-in-kind. ACDA's external research program, described in the answer to your first question, supplements this support. We have encouraged other governments to similarly make voluntary contributions.

Continue to ensure that staff selected for assignment to the IAEA Department of Safeguards and Inspections are persons of the highest technical competence;

Continue to provide direct political support and encouragement to the Agency to ensure its effectiveness, and stimulate other governments to provide such support.

Question 6. In your statement, you mention the need to improve effectiveness of IAEA safeguards. Could you elaborate upon that?

Answer. Some of the areas in which we should be seeking improvement are: (1) minimizing the elapsed time between data collection and evaluation, especially where weapons-usable material is involved; (2) increasing the use of special safeguards instrumentation and techniques, such as isotope correlation; and (3) further work on the special problems of safeguarding reprocessing and enrichment plants, weapons-usable material, and fuel elements containing such material.

Question 7. What is your current assessment of the Soviet attitude toward arms control, with particular regard to SALT and the test ban?

Answer. We expect the Soviets to continue to use arms control and disarmament as a means for political and military advantage; but we also believe they are serious in their interest in agreements that might be reached for the mutual advantage of the US and USSR.

The Soviets have clearly indicated they believe a SALT agreement could contribute to their security. However, their interest is probably not so pressing that they are desperate to conclude an agreement. The SALT TWO negotiations now underway are serious efforts by both sides involving many technical and complex questions.

The Soviet approach to a comprehensive test ban (CTB), proposed at the last session of the United Nations General Assembly, is very questionable. As the United States stated at the time, we regard the Soviet proposal to be highly unrealistic, because (1) it requires all nuclear-weapon States to participate, (2) it does not provide for adequate verification, and (3) it does not adequately deal with the problem of controlling and verifying peaceful nuclear explosives (PNEs).

Question 8. If the guidelines agreed to by the suppliers had been in effect last year, would the deal between Germany and Brazil have been prevented?

Answer. The safeguards being obtained in the German/Brazilian transaction are consistent with the suppliers guidelines, and in fact include some innovations that are reflected in the guidelines. No definitive answer can be given as to whether the increased sensitivity to non-proliferation concerns and the tendency toward earlier and closer consultation on important nuclear export matters which have resulted from the process of evolving the guidelines might have led to a different result.

Question 9. How many nations do you believe might have nuclear weapons in 1985?

Answer. One cannot, of course, give any reliable predictions. If adequate priority is given by the United States and other nuclear industrial countries to pre-

venting the further spread of dangerous nuclear technology, the increase, if any, in the numbers of states with nuclear weapons in 1985 may be very small.

Question 10. What is the best that we can expect to achieve in attempts to stem the spread of nuclear weapons?

Answer. I think the best we can expect is to maintain and broaden the present worldwide commitments to non-proliferation, to preserve the technical difficulties of making nuclear explosives, and to protect the tradition—observed for the last thirty years—that the use of nuclear weapons must be avoided.

Question 11. Would the new supplier guidelines, in force then, have prevented India from undertaking the present nuclear test program?

Answer. While this, too, is a question to which no definitive answer can be given, I believe that if the new guidelines had been in effect at an early stage of the Indian program, the Indian development of a nuclear explosive would have been far more difficult, if not impossible. Among other considerations, it would have been virtually impossible for the Indians to have acquired unguarded nuclear materials, such as those actually used in their detonation.

Question 12. Do you sense any developing desire among potential recipients of nuclear assistance to develop guidelines more binding upon the recipient nations?

Answer. The recommendations of the NPT Review Conference, which included a large number of potential recipients who are parties to the NPT, reflect the desire of such parties to have all recipients subject their peaceful nuclear programs to the most comprehensive possible safeguards coverage. In addition, we are aware of an initiative by Finland to encourage potential recipients to confine their nuclear commerce to suppliers who require such comprehensive safeguards coverage.

Question 13. What particular goals are you setting for the Agency in the near future? What are your priorities?

Answer. The United States Government is today making strong efforts to forge new arms control agreements on several fronts. We feel that the spread of nuclear weapons is probably the most urgent problem facing this country and the world. Such proliferation would undermine our ability to defend ourselves and our Allies, and would at the same time increase the chance of nuclear accidents and nuclear war.

As a top priority, this Agency is pursuing the goal of organizing multilateral action with other governments to stop or at least slow proliferation. We are backing this up with many research and policy efforts. ACDA has taken the lead in developing improved safeguards and in advancing the consideration of complimentary non-proliferation strategies, such as the concept of the multinational regional nuclear fuel-cycle center.

Agreements on limiting strategic weapons (SALT) and the NATO and Warsaw Pact forces in Central Europe (MBFR) are also important goals. We are seeking a SALT agreement that conforms to the principles reached at Vladivostok, but the new issues of cruise missile and Backfire bomber have complicated the picture. They have made verification of strategic arms agreements more difficult; and they have introduced new issues that affect the task of limiting nonnuclear and nuclear regional forces because these weapons may be used for both strategic and theater warfare. Since our ultimate goal, is of course, security, not merely agreements, we are moving very carefully.

NON-PROLIFERATION ISSUES

TUESDAY, FEBRUARY 24, 1976

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met at 2:55 p.m., pursuant to notice, in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington and Javits.

Senator SYMINGTON. Now would you identify them by name for the record?

STATEMENT OF GEORGE S. VEST, DIRECTOR, BUREAU OF POLITICO-MILITARY AFFAIRS, DEPARTMENT OF STATE; ACCOMPANIED BY THEODORE B. DOBBS, REPRESENTATIVE OF THE ASSISTANT SECRETARY FOR CONGRESSIONAL RELATIONS, AND LOUIS NOSENZO, BUREAU OF POLITICO-MILITARY AFFAIRS

Mr. VEST. Yes, sir. There is Mr. Dobbs who is the representative of our Assistant Secretary for Congressional Relations. And Mr. Nosenzo who works for me in my own Bureau of Politico-Military Affairs in the Department of State.

Senator SYMINGTON. Thank you, Mr. Vest.

PARTICIPANTS IN CONFERENCE AND THEIR ATTITUDES

Would you list for us the participants and give us a rundown on the attitudes that each of these countries took toward the conference and the various aspects of the agreement?

Mr. VEST. [Deleted.]

There are other countries that are, however, incipient suppliers that we did not add at this point.

Senator SYMINGTON. Did we ask the People's Republic of China to come?

Mr. VEST. No, sir.

Senator SYMINGTON. Why not?

Mr. VEST. It was the judgment they were not prepared to engage in such a thing with the other countries at this stage.

Senator SYMINGTON. But we did ask the Soviet Union?

Mr. VEST. [Deleted.]

Senator SYMINGTON. But if we lock up all the doors but one or two, then you may lose everything in the long run.

Mr. VEST. It was understood from the beginning this was a process in which there were a number of more doors we are going to have to deal with. [Deleted.]

Senator SYMINGTON. I am only asking.

Mr. VEST. I know, sir.

Senator SYMINGTON. [Deleted.]

Mr. VEST. We picked this hard group. We recognize it is the hard core. If we can make a successful beginning with this hard core, we then will see how we can expand. That was the philosophy with which we got started.

Senator SYMINGTON. I was thinking out loud.

[Deleted.]

Mr. VEST. [Deleted.] We suggested the group ourselves. But they dictated that it should be small and that it should be confidential.

Senator SYMINGTON. Did we submit the list to them for approval?

Mr. VEST. We circulated the list to all the countries and said, "Are you interested? This is the group we have in mind." And they all came back in the end and said, "Yes we would be prepared to come together with such a group—if it is private, if it is informal, and if we can explore what we are coming to."

So that is exactly how we got in it.

[Deleted.]

SUPPLIERS

Senator SYMINGTON. When you say supplier, supplier of what?

Mr. VEST. Supplier of nuclear materials or nuclear installations for sale.

Senator SYMINGTON. Are you talking about plutonium, the enrichment process or what?

Mr. VEST. Reactors, the sale of reactors; fuel service; enrichment; reprocessing.

CONSENSUS AT WHICH CONFERENCE ARRIVED

With that as a background, we started having meetings in April. We had four meetings throughout the period. We finally arrived at a consensus which I have just described for you actually as what we did.

That consensus was arrived at in November. Everyone agreed as a gentleman's agreement to run their policy in accordance with those principles, [deleted].

We did notify each other. And at that point each of us had made a commitment we would implement our policy on that basis. That has been a commitment ever since that time.

Senator SYMINGTON. Do you feel you are getting anywhere with this?

Mr. VEST. Yes; in two ways: There is a beginning of, one, a more severe constraint and safeguarding on the exchange of materials, and particularly technology; but second, much more important, I think we have begun the process of very much more of an inhibition on the part of these countries in going ahead.

[Deleted.]

I would have said at the beginning of last calendar year very few of these things would have been spoken about among us bilaterally because it was competitive business. By the end of the year, while still competitive business, each of us realized we had a large interest in putting some common context for that competitive business.

[Deleted.]

FRENCH REFUSAL TO SIGN NON-PROLIFERATION TREATY

Senator SYMINGTON. Inasmuch as there is absolutely no clout, no thrust in the IAEA [International Atomic Energy Agency] in Vienna—we checked that very carefully last summer—why wouldn't the French sign it?

Mr. VEST. You mean the NPT [Non-Proliferation Treaty]?

Senator SYMINGTON. Yes.

Mr. VEST. It is part of the Gaullist politics, that they have never been able to scrap, that they must maintain that independence that they have had since de Gaulle started them with their own independent nuclear policy, and that they would not agree to anything that would inhibit it in any way. It is the same principle.

Senator SYMINGTON. They are not hindered in any way by the NPT.

Mr. VEST. The problem is French politics. It is the same thing that keeps the French from taking a role in CCD [Conference of the Committee on Disarmament] in Geneva. It may not be rational, but it is politics.

Senator SYMINGTON. Then it is irrational politics.

Mr. VEST. It is irrational politics.

Senator SYMINGTON. Is there no way we can get some of the other countries to put some pressure on the French?

Mr. VEST. We have not discovered in the whole period since de Gaulle took over that you could order the French around, and our friends in Europe never have been able to.

Senator SYMINGTON. I wasn't talking about ordering anybody around. But inasmuch as there is but all form and no substance in Vienna, except from the standpoint of discussion and possibly some knowledge, why wouldn't they be willing to join it? If they are not willing to join it, why can you believe they are doing anything but moving ahead with their nuclear position, [deleted].

FRENCH COOPERATION IN TERMS OF IAEA

Mr. VEST. Let me make the point in terms of IAEA, the French are going right along and cooperating all the way through. So in the practical consequence they are doing that.

On the IAEA I have heard the criticisms and I recognize the problems. But the IAEA is the one thing we have got. It is the one thing we can strengthen to put a finger on.

Senator SYMINGTON. Do the French go there to visit periodically?

Mr. VEST. To the IAEA? They are most active. There is a meeting of the IAEA directors next week—or this week. I would guess that the French delegation to that meeting will be about the most, or one of the most experienced and contributory.

Senator SYMINGTON. So they get all the knowledge but they make no contribution; is that right?

Mr. VEST. No, sir. They make their contribution through what is being done in IAEA. They are very active in IAEA.

Senator SYMINGTON. Do they pay any dues?

Mr. VEST. Yes.

Senator SYMINGTON. The French do?

Mr. VEST. Yes; they do.

Senator SYMINGTON. You are sure about that?

Mr. VEST. Yes, sir. If Mr. Nosenzo tells me so, I am sure.

WHY FRENCH WON'T SIGN NPT

Senator SYMINGTON. They won't sign the Non-Proliferation Treaty?

Mr. VEST. That is correct, sir.

Senator SYMINGTON. Why won't they do that? It doesn't mean anything. They can sign it and get out of it in 90 days.

Mr. VEST. As I said, sir, for them it is politics, and politics is not rational, not necessarily rational. In this case that is exactly the way they are.

[Deleted.]

NEXT MEETING OF CONFERENCE

Senator SYMINGTON. When are you going to have your next meeting? I am watching the clock now because we are going to have a vote.

Mr. VEST. The next meeting will be in June; and in the intervening period, the next problem we are undertaking is to extend this activity to other countries.

Senator SYMINGTON. Where will it be?

Mr. VEST. [Deleted.]

Senator SYMINGTON. Why don't we have it in Germany or France or Paris?

Mr. VEST. Because when you try to get a consensus among this group, they all agree they want to meet in [deleted].

Senator SYMINGTON. Why is that?

Mr. VEST. It is the nearest geographic point.

Senator SYMINGTON. For everybody?

Mr. VEST. For everybody. It is also a large city in which everybody can meet quietly, and the [deleted] government has done such a good job of it.

Senator SYMINGTON. Mr. Vest, we will have to leave. We have to vote. I would like unanimous consent that either Senator Javits or I submit questions for the record, that you be good enough to answer in executive session, and then we will get you back at your convenience.

Mr. VEST. Certainly, sir.

Senator SYMINGTON. Thank you very much.

Thank you for being a very tolerant and constructive witness.

[Whereupon, at 3:10 p.m., the subcommittee adjourned, subject to the call of the chair.]

[Mr. Vest's responses to additional questions of Senator Symington follows:]

MR. VEST'S RESPONSES TO ADDITIONAL QUESTIONS OF SENATOR SYMINGTON

Question 1. For a less-developed country, what is the cost comparison between buying enriched fuel for power production and indigenous production?

Answer. An estimate of the cost for indigenous fuel enrichment in a less developed country would be a highly speculative figure. The gaseous diffusion enrichment process, which has been used for 25 years in the United States, is both energy and capital intensive. Many developing nations utilize less electricity *in toto* than is required for the operation of one large gaseous diffusion plant, and many have a Gross National Product less than the total investment needed to build such a plant.

On purely economic grounds, developing countries which have a need for nuclear power would accordingly be well advised to buy enrichment services from the available suppliers, including at this time the United States, the USSR, and Urenco, the tripartite (French-Dutch-German) organization, rather than to attempt the indigenous commercial production of enriched uranium for operation of light water systems.

Question 2. Roughly how much does it cost for a nation to buy a nuclear enrichment plant or a uranium reprocessing plant?

Answer. The following cost of economically viable enrichment and reprocessing facilities are based upon estimates made for construction in the United States. A 1,500 ton per year reprocessing plant is estimated to cost \$700-\$800 million, excluding costs of waste disposal and fuel fabrication or other related facilities. A 9 million separative work unit (SWU) annual capacity enrichment plant is estimated to cost \$3-\$3.5 billion for the plant alone, excluding the capital costs of associated electric power plants. Such a SWU capacity would be equivalent to one large gaseous diffusion plant or three centrifuge enrichment plants.

Question 3. In your statement on February 24 you said that recipients will be required to give "assurances" our exports will not be used to make nuclear explosives. Could you describe these "assurances" more fully? What enforcement rights will the United States have?

Answer. Participants in the London consultations have decided that they will require from recipients of nuclear exports formal governmental assurances that explicitly exclude uses which would result in any nuclear explosive device. No specific form for the assurances has been prescribed. However, the United States for its part has decided to require recipients of its exports to agree to terms such as the following:

"No material, including equipment and devices, transferred to (recipient country) or authorized persons under its jurisdiction by purchase or otherwise pursuant to this agreement, and no special nuclear material produced through the use of such material, equipment or devices, will be used for atomic weapons or other nuclear explosive devices, for research on or development of atomic weapons or other nuclear explosive devices, or for any other military purpose."

This or similar language will be included in new Agreements for Cooperation (in the peaceful uses of atomic energy) into which the United States enters. The language makes more explicit the atomic weapons/military use proscriptions which are part of all existing Agreements for Cooperation. Where transfers are made or contemplated under older agreements, the United States has made clear that it regards so-called "peaceful nuclear explosives" as included in the atomic weapons proscription.

In the event of non-compliance with the assurances on explosive use and military application, the United States would have the right, as it does now, to terminate the agreements under which the misused transfers occurred, to suspend further transfers, and to require the return of any materials, equipment, and devices transferred under the agreement. We would expect to include explicit statements to that effect in future Agreements for Cooperation with recipients of U.S. nuclear assistance, in clarifications of existing Agreements, or in specifications of terms for transfers under such Agreement.

Question 4. How many nations do you believe might have nuclear weapons or the ability to assemble nuclear weapons quickly in 1985? Who are they?

Answer. Except for the five nuclear weapons states (US, UK, USSR, France, and China), the only country to have actually exploded a nuclear device is India. In May, 1974 it set off a nuclear explosive which it alleged was designed for peaceful purposes. We are unaware of any other country which is on the verge of obtaining a nuclear explosives capability in the near future. The longer term future is more difficult to assess.

Question 5. Will the nuclear suppliers' undertaking have any immediate effect upon any nation in terms of deterring development of a nuclear weapons option?

Answer. Information is classified and in committee file.

Question 6. Can you provide copies of the unilateral notes committing participants in the supplier discussions to observance of the Guidelines for Nuclear Transfers?

Answer. Information is classified and in committee file.

NON-PROLIFERATION ISSUES

MONDAY, MARCH 15, 1976

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 4:10 p.m., in room S-116, the Capitol Building, the Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, Case, and Javits.

Also present: Mr. Pat Holt, chief of staff.

Senator SYMINGTON. We are now in a closed session.

COUNTRIES WHICH HAVE PARTICIPATED IN LONDON MEETINGS

Mr. Vest, would you please first state for the record the names of the countries which have participated in these London meetings.

STATEMENT OF GEORGE VEST, DIRECTOR, BUREAU OF POLITICO-MILITARY AFFAIRS, DEPARTMENT OF STATE; ACCOMPANIED BY GERALD OPLINGER, DEPUTY DIRECTOR, OFFICE OF NUCLEAR POLICY AND OPERATION, DEPARTMENT OF STATE

Mr. VEST. The names of the countries which have participated in the London meetings so far are [deleted] and, of course, ourselves.

Senator SYMINGTON. [Deleted.]

Mr. VEST. Yes, sir.

PURPOSE OF MEETINGS

Senator SYMINGTON. What has been the purpose of these meetings?

Mr. VEST. The purpose of the meetings was to work out agreed guidelines which each of the countries would then implement in connection with the sale of nuclear technology, nuclear supplies.

Senator SYMINGTON. Why have they been conducted in secret?

Mr. VEST. The reason that they have been conducted in secret was simply because several of the countries [deleted] wished and said if they were to be participating in these meetings, they would like to have them secret.

[Deleted.]

Senator SYMINGTON. These are your own personal opinions, right?

Mr. VEST. Yes, sir.

Senator SYMINGTON. On [deleted] right?

Mr. VEST. Yes, sir.

Senator SYMINGTON. Are they the opinions of the Department of State?

Mr. VEST. I think so, yes, sir.

Senator SYMINGTON. Yes, sir.

FRENCH COMPLIANCE WITH UNDERSTANDING REACHED IN LONDON

Now, Agence France Service and Press Information, 927 Fifth Avenue, New York, has issued a statement on conditions under which France supplies nuclear materials under the agreements made in London. It says France only concluded contracts that "respected the London agreements and that required the parties with which it signs these contracts to give the guarantee stipulated in the London agreements."

What does that mean?

Mr. VEST. It means, sir, that in the sale of sensitive exports, reprocessing, the parties involved reached an understanding—and this was as far as I could get them to agree—reached an understanding on the following: That they would exercise restraint in the supply of these exports; that they would encourage the concept of a multinational regional facility where possible; and that any sensitive facilities built from these plans or their sale, would be safeguarded under IAEA conditions and that such facilities could not be duplicated and rebuilt using this transferred technology.

In other words, we safeguarded the technology as well as the operation itself.

But when the French make that statement, then, that they are complying with the understanding reached in London, they are being correct, and the agreements which they have brought before the IAEA in Vienna, which are a trilateral between Pakistan, France, and IAEA have built into them provisions calling for exactly those safeguards.

FRENCH AND WEST GERMAN REFUSAL TO STOP EXPORTING REPROCESSING PLANTS

Senator SYMINGTON. The next paragraph of this states:

This explanation by French informed sources seems to be in direct response to an article which appeared in "The New York Times" on February 29, according to which France and West Germany had refused an American request to stop exporting nuclear fuel reprocessing plants.

Is that true?

Mr. VEST. Yes, sir.

Senator SYMINGTON. We did request it, and they did refuse it?

Mr. VEST. This refers back to Pakistan?

Senator SYMINGTON. I am just quoting from the article. Pakistan is not in the release of the French Government.

Mr. VEST. In the general sense we have asked France and Germany, wherever the occasion has arisen, not to export to reprocess—the sale of reprocessing.

Senator SYMINGTON. And did they agree to it?

Mr. VEST. No, sir, they have never agreed to it; but that is not contrary to the London understandings, because the London understandings do not prohibit the sale of reprocessing.

Senator CASE. The sale of what?

Mr. VEST. The London understandings, the safeguard guidelines, do not prohibit the sale of reprocessing plants. It calls for certain safeguards in connection with the sale of it.

[Deleted.]

Senator SYMINGTON. Well, we will get to that in a minute.

AGREEMENT TO SAFEGUARD TECHNOLOGY

Senator CASE. Excuse me. I want to be sure I understand, Mr. Chairman.

Senator SYMINGTON. Certainly.

Senator CASE. They agree not to sell the technique or the technology, but they do not agree not to sell the plant?

Mr. VEST. No, sir, they agree to safeguard the technology.

Senator CASE. What does that mean?

Mr. VEST. That means that the operation of the plant must be safeguarded by inspectors, and that a duplicate or a replication of that plant cannot be built without accepting IAEA safeguards. In other words, that is to prohibit us from doing the following—a country—from selling a reprocessing plant, which after all is largely and to a considerable extent engineering technology; you sell it to a country and then the country says, "Aha, now that I have built one I see exactly how it is all done, and I will now build one of my own." Well, under these agreements each country receiving such a reprocessing plant has to sign in its contracts and agreements that it will not and cannot replicate or duplicate without accepting IAEA safeguards on the duplicate plant.

Senator CASE. But it can sell the original plant?

Mr. VEST. It can sell the original plant, that is correct.

Senator CASE. To anybody?

Mr. VEST. That is correct, with the consent of the original supplier.

Senator SYMINGTON. And what would happen if it changed its mind and decided to build its own?

Mr. VEST. If a country chooses to throw over such agreements, they are going to prejudice, they will be open, they will be prejudicing their complete area of their relationship with that country.

Senator SYMINGTON. So what?

Mr. VEST. Well, it depends upon what things that country does for it. If it is turning over nuclear fuel to it, or uranium, or if it sells a particular delicate kind of armament, or if it is producing some type of computer, you would survey the whole course of your relationship.

LONDON AGREEMENTS: WHEN CONCLUDED, PARTICIPANTS AND CONTENTS

Senator SYMINGTON. Let me go on with this now.

The London agreements were concluded last November among Canada, France, West Germany, Japan, the Soviet Union, United States and Britain. Under these agreements countries buying nuclear fuel reprocessing plants give guarantees

to insure that these plants cannot lead to the manufacture of atomic or thermonuclear bombs. The aim is to prevent the proliferation of such weapons throughout the world.

This is from an Agence France Presse dispatch of March 1, 1976. Have you any disagreement with that?

Mr. VEST. No, sir.

PROGRESS MADE AT LONDON MEETINGS

Senator SYMINGTON. Now, what progress do you feel has been made at these meetings in London?

Mr. VEST. Two kinds, sir. The first progress is the extent to which we were able to get together all of these countries, [deleted] who have not in the preceding year been discussing nuclear affairs with each other at all. In fact, it was considered a commercial secret, a competitive affair, and it was not something that you could get people to tell each other about.

We were able to get them first to come together specifically and agree on these guidelines as a beginning step. As a process it was less than we would have liked—

Senator SYMINGTON. Wait a minute, now. Are not more than one of these countries members of the IAEA in Vienna?

Mr. VEST. All of them function in the IAEA, sir.

Senator SYMINGTON. Well then, are they just trading thoughts over there, are they not, or is that just a phony?

Mr. VEST. The distinction works this way. All of the negotiation between a country that is selling something is done first, and then, when you come to the end of it, they produce an agreed document which goes to the IAEA.

Now, it is the preceding negotiation, which is of very grave importance because there is when you begin to talk about what are the terms of trade.

What we have begun, in addition to having these first guidelines, which are a departure point which we would like to continue to improve upon, is establish a situation where we are talking casually and immediately, all the time, to countries about prospective sales, which is something that did not happen before at all.

That means a great deal today.

HAVE OTHER NATIONS MADE UNILATERAL DECLARATIONS OF PRINCIPLES

Senator SYMINGTON. Well, now, the United States recently made a unilateral declaration of principles that we would follow in making decisions on nuclear exports. Has any other participant in the London meetings made such a statement?

Mr. VEST. [Deleted.]

Senator SYMINGTON. Don't lose me now. You see, I am trying to follow you. I asked you a question. The United States recently made a unilateral declaration of principles that we would follow in making decisions on nuclear exports.

Mr. VEST. I am sorry, sir.

Senator SYMINGTON. All right. That was a question.

Mr. VEST. I misunderstood.

Senator SYMINGTON. Wait a minute now.

Now, if you remember there have been a lot of problems in SALT because we made unilateral statements and then were upset, at least the Government said it was upset, because the Russians said we did not agree to it.

Mr. VEST. Right.

Senator SYMINGTON. OK. Now I want to ask the question again.

Has any other participant in the London meetings made such a statement?

Mr. VEST. [Deleted.]

STATUS OF JAPANESE RATIFICATION

Senator SYMINGTON. How many times has it come before the Japanese Diet, the NPT?

Mr. VEST. For ratification?

Senator SYMINGTON. Yes.

Mr. VEST. It has not been brought there yet.

It has to go through committee, and then go to the Diet.

Senator SYMINGTON. Why has it not gone through committee?

Mr. VEST. The reason it has been so slow going through is because there is large-scale opposition in the Japanese political body to going ahead and ratifying the NPT. It makes no sense.

Senator SYMINGTON. Why?

Mr. VEST. Because simply the Government wants to do it, and therefore the opposition opposes it.

It is purely internal Japanese politics.

Senator SYMINGTON. [Deleted.]

HAS UNITED STATES APPROACHED RUSSIANS BILATERALLY?

Senator SYMINGTON. Has the United States approached the Soviet Union on a bilateral basis regarding the possibility of closer cooperation on this issue of nuclear proliferation?

Mr. VEST. No, sir.

Senator SYMINGTON. It has not?

Mr. VEST. No, sir. [Deleted] we did not approach the Russians bilaterally to make a special arrangement.

Senator SYMINGTON. Why not? We approached them bilaterally on SALT.

Mr. VEST. We approached them bilaterally on SALT because it involved our weapons and our major separate activities. In this particular one, if we wished to get the other countries involved to cooperate with us, we could think of no other way to kill it more quickly than to try to set up a Soviet-United States condominium.

OPPOSITION TO U.S. SUGGESTED EXPORT BAN

Senator SYMINGTON. The press has reported that France and West Germany have opposed the U.S. suggestion that the exporting of nuclear reprocessing facilities be banned.

Is this true?

Mr. VEST. I'm sorry, sir. Would you repeat that again?

Senator SYMINGTON. Yes.

The press has reported that France and West Germany have opposed the U.S. suggestion that the exporting of nuclear reprocessing facilities be banned. Is this true?

Mr. VEST. Yes, sir.

Senator SYMINGTON. It is true?

Mr. VEST. Yes, sir.

WHAT HAS BEEN AGREED TO

Senator CASE. Mr. Chairman, could I take half a minute?

Senator SYMINGTON. Go right ahead.

Senator CASE. Would you tell me just what the deal is that has been agreed to so I will have a little better understanding.

Mr. VEST. In the simplest way, sir, what we have agreed to, particularly in relation to reprocessing, first that there would be IAEA safeguards.

Any of us [deleted]—that each of us, I should say, would apply IAEA safeguards on sales, that—

Senator CASE. Sales of what?

Mr. VEST. Sales of nuclear technology and nuclear materials.

Senator CASE. Nuclear materials includes machinery, hardware, as well as uranium?

Mr. VEST. Yes, sir. [Deleted.]

Senator CASE. I see. OK.

Mr. VEST. Now, in addition to that, any recipient—

Senator CASE. Excuse me. What did we agree when we sold it?

Mr. VEST. That they would have IAEA safeguards. That means that everything would be subject to IAEA inspection.

Senator CASE. That is, the buyer had to agree to that?

Mr. VEST. Had to agree to that.

Senator CASE. OK.

Mr. VEST. In addition, the buyer had to agree that anything that they got would not be used to produce any kinds of nuclear explosion, peaceful or otherwise, because that is not covered in any other agreement of any kind.

Similarly, it was decided that the recipients would also have to give complete assurances on retransfer, so that if they got anything, they could not retransfer it, use it in some other way, pass it on to somebody else.

Senator CASE. Earlier you said they could sell a plant.

Mr. VEST. No. If we sold it to country A, country A could not retransfer it to country B, without requiring the same terms attached to the original transfer.

Now, in addition you have sensitive exports, which are primarily reprocessing enrichment and heavy water production. In this area they can, when that is sold, while we wanted to discourage it in every way, we could not get them to ban it; but if sold, that all of those plants would have to be under safeguards as well, and any further facilities which might be derived from it would automatically have to be under safeguards. So, everything would remain under IAEA safeguards.

Now, I should emphasize that IAEA safeguards are not police safeguards. It is a rather poor word.

Senator CASE. Just an accounting procedure?

Mr. VEST. Safeguards is an accounting and a revealing. If there has been a loss or a subterfuge, that inspection process should reveal it.

CONCEPT OF MEANINGFUL CONTROL QUESTIONED

Senator SYMINGTON. Well, if the Senator would yield, what I do not understand is we took an expert off the Joint Committee, off this committee, off the Armed Services Committee, and we went to Vienna and spent days there. We went out and talked to different people in the IAEA. We concluded that the whole concept of any meaningful control was just a lot of bunk, and it was, if anything, worse than the concept of Cloud at the U.N., from the standpoint of the way that operated.

Now why, if that is true, and we studied it carefully and we came to that decision, and we gave the reasons why and we crisscrossed our information with each other—and perhaps there, four, I believe everybody in this room was in that group—why should they be in such a sweat, [deleted] worrying about the IAEA? The IAEA means nothing. You can get out of it in 30 days by simply announcing you are going to get out of it. Why should they be in such a sweat about us being forced to keep all of this business secret when if it is made public, it does not mean anything anyway?

Mr. VEST. Sir, I would suggest that if they are in a sweat, it must have more validity than seemed to you when you were there.

Senator SYMINGTON. Well, now, you know perfectly well that it has little validity, because any member that signs up with the Non-Proliferation Treaty can find out everything that is known and get everything they can get their hands on, and then in 90 days they can be out.

Mr. VEST. But if I may go on with that, sir, there is no treaty that I know of, practically, that I can recall offhand, that does not have a withdrawal clause. What your withdrawal clause does is signify that this country is on the loose and what are you proposing to do in the other realms of activities to penalize it.

Senator SYMINGTON. Well, we certainly let the Germans go on the loose when it came to Brazil; [deleted]. So, I just do not follow it. But I want to ask some more questions, so I will drop it.

HAS AGREEMENT IN WRITING BEEN REACHED?

Has any agreement in writing been reached at the London meetings?

Mr. VEST. [Deleted.]

Senator SYMINGTON. Thank you.

IMPACT OF MEETINGS ON IAEA ACTIVITIES

What impact, if any, have these meetings had upon the current or planned activities of the IAEA?

Mr. VEST. The impact has been to rather speed up the interest in the IAEA because the consequence of this, if this goes on, will be that they will have to have more inspectors and a much more precise kind of activity than they have had in the past.

ACTIVITIES OF IAEA INSPECTIONS

Senator CASE. Excuse me. Do they have inspections onsite all the time?

Mr. VEST. What was that, sir?

Senator CASE. Do they have inspectors onsite in each of the member countries?

Mr. VEST. No. They are measuring by visit, not onsite. I think that is correct. Is that, do you know, Gerry?

Mr. OPLINGER. Yes; that is right.

Senator CASE. What does that mean?

Mr. VEST. It means that they visit at periodic intervals and measure the input and the output and the material that is going on.

Senator SYMINGTON. What we call in industry a spot check. They go in and check it, and then come out, and then go back and check it.

Mr. VEST. Yes.

Senator JAVITS. Could I ask a technical question, Mr. Chairman?

Senator SYMINGTON. Yes.

ARE THERE DIFFERENCES IN SAFEGUARDS?

Senator JAVITS. You gave us four items, as I noted, and in item one you spoke of IAEA safeguards, which I gather are essentially accounting safeguards, after the fact. Then you spoke of spot checking.

When you got to item 4, why did you make a distinction? Item four requires that when heavy water or reprocessing is sold, they must also be under IAEA safeguards. Is there any sum difference between the kind of accounting and inspection in four and in one?

Mr. VEST. It will be much more important, much more important.

Senator JAVITS. But is there any difference why they had to be specified separately once you said that anything they sold had to be under IAEA safeguards. Why did that not cover everything, including heavy water or reprocessing?

Mr. VEST. I am sorry if I gave special emphasis to the safeguards on these three.

Senator JAVITS. Are they the same safeguards?

Mr. VEST. They are the same safeguards. However, we are moving into an area where they have not heretofore done this, and it is a new job they will have to undertake.

Senator JAVITS. Thank you, Mr. Chairman. I did not mean to usurp your time.

Senator SYMINGTON. Oh, please do.

REMOVAL OF COMPETITION IN SAFEGUARDS

Have the London meetings achieved any results with regard to removing competition in safeguards from economic competition in the nuclear field?

Mr. VEST. I think I would say yes, sir, because safeguards are not an area of competition any more. Any contract will all—each contract that comes out now to the IAEA will automatically have safeguards, and everything sold by any one of us will have it built in. So competition in safeguards is no longer an issue.

TERMS OF SUPPLIERS DECLARATIONS

Senator SYMINGTON. There has been comment in the press that the terms of the suppliers declarations are counter to the terms of the Euratom Treaty. Is that correct?

Mr. VEST. I'm sorry, sir, but I'm not familiar with that.

Senator SYMINGTON. Would you check that for the record and let us know?

Mr. VEST. Yes, sir. I will.

Senator SYMINGTON. Thank you.

[The information referred to is classified and in the committee files.]

Senator SYMINGTON. Have the London meetings achieved any results—I asked that question.

Let's get to the next question.

U.S. OPPOSITION TO SALE TO PAKISTAN

Secretary Kissinger has testified last week before Government Operations that we are making, and I quote, "the strongest representations" in opposition to Pakistan's purchase from France of a reprocessing plant.

Now, as I get your testimony this afternoon [deleted]. Have they taken the same position with respect to Pakistan? Have they passed that buck over to us?

Mr. VEST. We have not had an answer from them, sir, [deleted]. In the case of Pakistan, we made the request to them that they not call. [Deleted] to stand aside. [Deleted.]

Senator SYMINGTON. What did they say?

Mr. VEST. We have not had an answer from them yet.

Senator SYMINGTON. How long ago did you ask them?

Mr. VEST. I would have to check, sir. The first conversation I had with the French was, I believe, 2 weeks ago?

Mr. OPLINGER. [Nods affirmatively.]

Mr. VEST. About 2 weeks ago. Thereafter the Secretary spoke to Mr. Bhutto himself who was then in New York.

Senator SYMINGTON. Secretary Kissinger?

Mr. VEST. Yes, sir. He raised the subject more than once to Bhutto in the course of the evening, and we have not had a final answer from the Pakistanis.

Senator SYMINGTON. What is the reaction of the Pakistanis as you refer it?

Mr. VEST. I can only guess—we have no final answer, but I would say the real reaction underneath their words is that they are very fairly negative and that they are insisting they will go ahead.

Senator CASE. May I interrupt?

Senator SYMINGTON. Yes.

Senator CASE. What did Dr. Kissinger say to Mr. Bhutto? Did he say we do not want you to do this? What were the arguments?

Mr. VEST. He said that this was an extraordinarily dangerous thing for them to undertake, that it would disturb people, the nuclear weapons competition, that it would prejudice the relationship of Pakistan to all of the other countries in its neighborhood, and that it would make, it would have a prejudicial effect as well upon the views

of many people in this country in relation to Pakistan if it went ahead with this.

As I say, we did not get a final answer.

Senator SYMINGTON. Now, when Secretary Kissinger—

Mr. VEST. But there was no—excuse me, sir—it was unequivocal. It was a very serious approach on the part of the Secretary.

Senator CASE. I do not question that. I just wondered.

Mr. VEST. Well, we had so much confusion over the German one that I just wanted to make it clear.

U.S. POSITION CONCERNING GERMAN SALE TO BRAZIL

Senator SYMINGTON. Well, I was going to bring up the German one because in effect, the Chancellor of Germany told his people and the world that the Secretary of State of the United States was not telling the truth. Did we have any written request asking that they not give the enrichment process to Brazil, the Germans?

Mr. VEST. There was a whole series of recorded approaches by officials, including our Ambassador in Bonn, and I think the records of this have been sent to your staff, I believe.

Senator SYMINGTON. Is that correct? Do we have those?

Mr. HOLT. Do we have those?

Senator SYMINGTON. Why would Secretary Kissinger make such a statement?

Mr. VEST. Well, as I mentioned, sir, when I appeared before you before, I can only guess that their government, as was the case with other governments in my experience, that the exchange of information had not gotten through—

Senator SYMINGTON. How do you mean that it hadn't—

Mr. VEST. That the Foreign Ministry had not sent a record of these previous conversations within the Foreign Ministry over to the Prime Minister's office.

Senator SYMINGTON. A long time after that they went through with the deal, which they did not have to do. They could have stopped it.

The American people are spending, I do not know how many billions, I know it is somewhere around \$17 or \$18 billion at one time and I think if anything, based upon what I hear about the military budget, it is going to be more. We are spending that to defend Germany. Why do we not take a stronger position when they in turn set it up for a country in this hemisphere to become a great nuclear power with their own uranium.

Mr. VEST. All I can say, sir, is that I know that the approaches were made, and I do know—well, I do not know what words were said between the two foreign ministers. It was discussed between the two foreign ministers. Clearly the Secretary of State must have expressed to the German Foreign Minister his opposition to this because when they came out from their meeting to the press, the press asked them did you settle this matter, and the two foreign ministers said, each of them, no, we did not agree in this area—so, obviously they had discussed up to a point of disagreement—but we understand each other's position more clearly.

This was a part of the public record, and that is all I know, sir.

Senator SYMINGTON. If we put all this armament in Germany and put nuclear weapons all over Germany and do all we have done for Germany since World War II, have we not got any trust at all when

we say we do not want you to make a nuclear power out of a country in South America?

GERMAN BELIEFS CONCERNING SALE TO BRAZIL

Mr. VEST. They have their own beliefs in this case, and their belief is as follows.

Senator SYMINGTON. Is what?

Mr. VEST. Is as follows. They say rather than say to the Brazilians no, we will not send you something, they argue, and there are people in this country who will echo that argument, that it is better for us to sell and be there as a part of it, keep an eye on it and insure external safeguards all the way through, rather than have it done by the Brazilians with their own resources, more slowly, but going ahead.

Senator SYMINGTON. There is no secret about the fact that the French may dislike us, but that they are afraid of the Germans and so are people in the Soviet Union. Under this deal the Brazilians in their own ships, or in German ships, could ship complete nuclear weapons back to Germany, could they not?

Mr. VEST. They would have to make them first, and they would have had to gull the whole IAEA safeguards activities.

Senator SYMINGTON. That does not mean anything. Have you read a book called, "The Curve of Binding Energy?"

Mr. VEST. No, sir.

Senator SYMINGTON. It's about the thinking of Dr. Taylor. He says one man, an expert scientist, who reads an encyclopedia article on nuclear weapons written by Dr. John Foster, a great nuclear physicist, can build a bomb.

Now, if they are so worried about it, why do they set this up, I cannot understand it, unless they are looking for a way to get weapons themselves?

Mr. VEST. I do not think they have to do that, sir, if they wanted weapons.

Senator SYMINGTON. How would they get them if they did not get them from Brazil?

Mr. VEST. I think that without getting weapons from Brazil, with the state of technology in Germany they could do what they have to do, short testing, and figure this out for themselves.

Senator SYMINGTON. And build their own weapons?

Mr. VEST. I think so.

Senator SYMINGTON. Like Hitler did?

Senator CASE. A supply of nuclear material is involved in this, is it not?

Mr. VEST. Yes. Sir, I am not trying to defend what the Germans have done with Brazil. I have no answer to this except to give you the fact that they have taken the position and why they have taken it.

Senator SYMINGTON. Where would they get plutonium to build their own weapons in the quantities needed?

Mr. VEST. I am not sure what they would do, nor where, sir. But in the world that is lying ahead, if someone is determined in a modern industrial state, is determined to do something, as many people allege Israel has done, people will find a way.

Senator SYMINGTON. Well, my point is I cannot understand why after all we have done for Germany after World War II, and our Sec-

retary of State testifies that he had pled with them, in the strongest terms not to make a nuclear power out of a country in this hemisphere, they go ahead and do it, and we just sit back and let them do it I do not understand that.

Mr. VEST. Their argument is that they are making it a nuclear energy power, not a nuclear weapons power.

Senator SYMINGTON. Well, of course that is absurd because they get their electric energy from nuclear power. They only put it from 0.7 to 3 to 4 percent. They do not have to go to 90 percent, and they can take the plutonium out of their residual and make weapons. Dr. Agnew, the head of Los Alamos Laboratories, pointed that out to me. So the idea that they cannot make nuclear weapons because they want to make electric energy only is just a fraud. That is the kind of thinking that gets into this picture and a lot of us, well some of us anyway, are getting increasingly suspicious about what is going on.

Mr. VEST. That is exactly why we have had these talks over the last year.

Senator SYMINGTON. In secret.

Mr. VEST. It does not change the effort, sir.

SECURITY OF TALKS QUESTIONED

Senator SYMINGTON. That is what you say, and I am not arguing with you because you are under instructions. But I think this matter is important enough for the people of the world as well as the people of the United States to know what is going on [deleted].

The other day I went to a hearing where there were three engineer who protested the General Electric and the Westinghouse reactors. You could not get within 20 or 30 yards of that hearing room because of the number of people. And it is a big hearing room. You have a hearing on what we are talking about—killing maybe hundreds of millions of people—and you cannot get any interest of any kind what ever anywhere in the world. The basic reason for it is that we are party to all of this secrecy, which is one thing that has gotten us into a awful lot of trouble in other fields besides.

Now let me proceed with my question.

NPT'S EFFECT ON NUCLEAR PROLIFERATION

Secretary Kissinger testified that adherence to the Non-Proliferation Treaty is a key element in preventing nuclear proliferation. On the other hand, some people believe that joining the Non-Proliferation Treaty may be a step toward a nuclear weapons program.

What is the view of this administration on that, and the potentiality of its use by countries so as to acquire nuclear weapons?

I think the Quadhafi statement in Libya was one thing that inspired some of this thinking.

Mr. VEST. It is perfectly possible that a country, any country, can use the NPT as an escape valve, if they want. They will merely sign the NPT and then say OK, we have signed the NPT, now we should have access to this or that or whatever it may be. [Deleted.]

Now, the NPT is only a part of the total policy. We are trying to encourage the acceptance of it, but no treaty guarantees a total sta

ility as a fact of life, and therefore the NPT could be used as an excuse, and that is exactly what we are on the lookout to avoid.

You have to look at the whole physical picture when you do it.

Senator SYMINGTON. Does the administration believe that the recent decisions by South Korea and Libya to join the Non-Proliferation Treaty may actually be a decision to acquire nuclear weapons?

Mr. VEST. I cannot say I have seen a firm statement on that, sir. Deleted.]

SECRETARY KISSINGER'S STATEMENT CONCERNING ADEQUACY OF IAEA SAFEGUARDS

Senator SYMINGTON. Now, Secretary Kissinger testified last week the IAEA safeguards were, and I quote, "adequate" to prevent nuclear proliferation?

I do not want to ask you to comment about your superior's statement, but to us that is one of the most absurd statements we have ever heard. How in the name of heaven, after you look at the actual IAEA safeguard system, can you say it is adequate to prevent nuclear proliferation? Who gives that kind of information to the Secretary of State?

Mr. VEST. I cannot say, sir. I do not know.

Senator SYMINGTON. Who is his professional technical advisor?

Mr. VEST. He has a whole Bureau for Scientific Affairs.

Senator SYMINGTON. He must get them out of the bottom drawer of the Bureau to make a statement like that to the American people, because that is not true. You know that as well as I do. So, why does a statement like that come out of the State Department?

Mr. VEST. I do not know, sir. But our position has been as follows: We know what the IAEA is trying to do. We know it is an agency in evolution, and it is the only one around that is acceptable to the large bunch of countries that we would like to have inspected; therefore our objective is to try to do what we can to beef it up, make it better, and have it perform the job satisfactorily.

Senator SYMINGTON. All we are trying to do is get the facts, and all we can rely on are the statements.

DID INDIA COMPLY WITH CANADIAN BILATERAL SAFEGUARDS?

Now, the Secretary also testified, and I quote—

We know of no nation that has acquired nuclear weapons through diversion of nuclear material subject to either bilateral or IAEA safeguards.

Does the administration believe that India complied with the letter and spirit of the Canadian bilateral safeguards?

Mr. VEST. If I am not mistaken, sir, I think India did. It complied with the letter of the safeguards.

Senator SYMINGTON. And the spirit?

Mr. VEST. I said the letter only.

Senator CASE. Could that be explained, I wonder, Mr. Chairman. I would like to know what it did.

Senator SYMINGTON. The Canadians were very upset about it.

Mr. VEST. The Canadians were very upset because they certainly felt that it very much violated the spirit of the agreement.

Senator CASE. In what way?

Mr. VEST. I wonder if I could ask Mr. Oplinger to explain a little more about the Indian matter.

Mr. OPLINGER. Yes, sir. I think that the agreement on the facility from which they produced their explosion provided that it could not be used for anything but peaceful purposes. So, the dispute was over what was a peaceful purpose. The Indians claim that their explosion was, in fact, peaceful. The Canadians said that that was never intended. So, the letter of the agreement, I think, was met, if you accept the Indian claim that it was a peaceful explosion.

Senator SYMINGTON. Are you saying that when the Canadians made the deal with India they knew that they were going to have an uncontrolled explosion?

Mr. OPLINGER. That the Canadians knew or that the Indians knew?

Senator SYMINGTON. That the Canadians knew that the Indians planned that explosion.

Mr. OPLINGER. No. I think that the Canadians would have felt that any explosion was nonpeaceful.

Senator SYMINGTON. Yes; but the point is that they were given the material to make electric energy, were they not?

Mr. OPLINGER. Yes, sir.

Senator SYMINGTON. And you do not, in order to make electric energy, you never have an uncontrolled reaction, do you?

Mr. OPLINGER. No, sir.

Senator SYMINGTON. Okay. But they had an uncontrolled reaction, in other words, an explosion, so they violated what the Canadians thought they were going to do with it, did they not?

Mr. OPLINGER. They violated what they Canadians thought they were going to do with it, but it is not clear that they violated what the agreement specifically said.

Senator CASE. This was an Indian ploughshare thing?

Mr. OPLINGER. Yes. They said it was for excavation purposes, that they were developing a device for that purpose.

Senator JAVITS. Have you seen the agreement between India and Canada?

Mr. VEST. No; we have not yet, have we?

Mr. OPLINGER. I do not know whether we have the text.

Mr. VEST. We know what the Canadians have told us.

Senator JAVITS. An agreement has words. There is a diametrical difference between the two parties on the words used, let alone the intent. That is what Senator Symington means.

Senator SYMINGTON. Senator Javits puts it better than I do. All I know is the Canadians were, well I do not want to use the wrong word, but they were intensely upset about it, let's put it that way.

Mr. VEST. They were sir, because they felt the Indians had violated the spirit and found an escape clause in the agreement that they had signed.

Senator JAVITS. Well, did the Canadians have a bad lawyer?

Mr. VEST. I do not—well, yes, obviously in retrospect.

Senator JAVITS. I think it is something we ought to see, I really do.

Mr. VEST. We will certainly check to see if we can get from our records copies of that particular agreement.

I might say that the Canadians have been the most careful people in every sense.

Senator CASE. That is a very high price to pay.

POSSIBILITY OF SOMETHING MORE THAN IAEA SAFEGUARDS

Has there been any discussion of the possibility of something more than the IAEA safeguard system? Has there been any serious discussion of some controlled handling, reporting, and returning of fissionable material?

Mr. VEST. Not that I am aware of, sir.

Senator CASE. There was no discussion of it. Have we ever considered making a proposal for a pooling of material and leasing it out and returning it and having that kind of check on it?

Mr. VEST. Not that I am aware of, Senator. I will check that for our information.

Senator CASE. Has our arms control agency ever considered this kind of thing?

Mr. VEST. I would have to check with them, sir.

[The information referred to is classified and in the committee files.]

PENALTIES FOR VIOLATING IAEA SAFEGUARDS

Senator SYMINGTON. I would like to ask this question, if I may.

If a country violates IAEA safeguards, the IAEA statute provides for the suspension of membership in the agency. Beyond suspension, is there any other penalty?

Mr. VEST. The penalty would be for the offended country to take what action it chooses across the board of its relationships.

Senator SYMINGTON. What would suspension of membership accomplish?

Mr. VEST. I would have to get that for you and report it, sir, I do not know.

Senator SYMINGTON. But there is not any, is there?

Mr. VEST. I do not know. That is why I say I would have to check.

Senator SYMINGTON. But you are the expert on this, and I do not know why. Now, if you do not know and I do not know. You see, we are waltzing around here, not you and me, but the whole idea, and the way this thing is being handled in Vienna, Geneva, and Washington, it is just a lot of nonsense when it comes to any thrust.

[The information referred to follows:]

IMPACT OF SUSPENSION OF IAEA MEMBERSHIP

(Supplied by Department of State)

Mr. VEST. Suspension of IAEA membership would have immediate impact in that benefits of membership, including technical assistance and participation in joint work on mutual problems associated with nuclear power, would be terminated. More important, however, is that such action would cut off the country in question from virtually all possible supply of nuclear materials, equipment, and technology since all significant suppliers are committed to IAEA safeguards. Such action might, of course, also lead to broader reactions.

WOULD U.N. SECURITY COUNCIL ACT ON IAEA SAFEGUARDS VIOLATION?

Senator SYMINGTON. My next question is, do you believe that the Security Council can be relied upon to do anything in the instance of a violation of IAEA safeguards?

Mr. VEST. Our National Security Council?

Senator SYMINGTON. The United Nations Security Council.

Mr. VEST. This is a personal opinion. No, sir, I do not count on them to do anything in this case.

Senator SYMINGTON. I worked awfully hard up there a year ago last fall on one particular item, and so did my colleague, Senator Percy. In support of our position we got four votes out of 138.

Mr. VEST. I do not expect anything from them.

Senator SYMINGTON. I have some other questions here, but I would be glad to yield at this time.

QUESTIONS FOR THE RECORD

Senator CASE. I want to have a general question, really, and then, if you would, the staff will give some of them to you to answer for the record so far as they have not been covered by other questions and other answers you have given.

OTHER COUNTRIES PERCEPTION OF PROLIFERATION THREAT

In your discussions with these other countries, [deleted] do you detect a real common interest in dealing with the threat of proliferation, or do you have to extract from each of them, using whatever tangible or intangible we have, their agreement?

Do they recognize it as a common problem? Or, do they not?

As members of the human race, what is your argument in that? If it is a serious thing, why do silly things [deleted] deter them from making agreements in their own best interest?

Do you understand the thrust of my question?

Mr. VEST. Yes, I do, Senator. I would say that I think, quite seriously, after negotiating with these people for a year, that they do share our perception of the problem, that they are serious about it. But each nation approaches it from a different background and with a different degree of either optimism or lack of optimism, and therefore it is that some countries are willing to obligate themselves further than others, or more rapidly than others.

It has been a process of very, very long and persistent discussion and persuasion to get countries in each case to take actions which are going to inhibit the way they do their business or run their own government, and so on. It has not been possible to move them faster. And, as I mention, they do know it is a process, it is a serious one. They want it to be applicable to other countries as well, and they recognize it is something that we are going to have to try to extend in its applicability as well as in its membership.

PRESS COMMENT ON NEGOTIATIONS

If I could throw in one more point, if I may, regardless of the fact that all of this has been carried on in a pseudo—or under the pseudo—fig leaf of confidentiality, as a result of the activities of the press in

each of the countries, it has been anything but confidential, and therefore there has been a rather high degree of comment in country after country. The only country I know of where it has not been commented on in is the Soviet Union.

Senator CASE. Has this comment hurt the negotiations?

Mr. VEST. [Deleted.]

Senator CASE. These things are almost the only optimistic activity that seems to be going on. I think the world is hungry for it.

Mr. VEST. [Deleted.]

Senator CASE. Thank you, Mr. Chairman.

Senator SYMINGTON. Thank you.

Senator JAVITS.

Senator JAVITS. Thank you, Mr. Chairman.

EFFECT IF IAEA GUIDELINES HAD BEEN IN EFFECT AS TO INDIA

I have a number of questions here. First, suppose that these IAEA guidelines or provisions had been in effect as to India; would they have prevented India from using these nuclear materials in order to fashion a bomb?

Mr. VEST. Excuse me. Each time on India I have to ask my expert. It is my understanding it would have been discovered, right?

Mr. OPLINGER. Well, if they had diverted materials that were under safeguards for use in this program, the IAEA would have known it early in the game if the inspections worked, as they were supposed to have, and the supplier would have known what was happening much earlier.

Senator JAVITS. And the world could then have zeroed in on India.

Mr. OPLINGER. Yes.

Mr. VEST. And the Canadians could have zeroed in on any further supply.

Senator JAVITS. Right.

POSSIBILITY OF FULL FUEL SAFEGUARDS

If you cannot get the other countries to accept the deal of banning reprocessing and heavy water, but you can get them to accept the application of IAEA safeguards for whatever they sell, could it possibly be extended? Could you require that the next thing you sold new to any country, that country would have to go under IAEA safeguards for the whole ball of wax—everything it had in the country respecting nuclear production?

Mr. VEST. Yes.

That as an idea was talked about last year. We did not—well, not exactly in that form, but the business of getting the full fuel safeguards, having one, anything trigger it—this was talked about, but we were never able to get agreement on that. But it seemed the simplest way to go about it, frankly.

Senator JAVITS. But it looks more likely, does it not, more propitious than the ban and an agreement on a ban. Is that correct?

Mr. VEST. Yes. That general line, that general approach is one that I would expect to be raised when we meet again, frankly.

Senator JAVITS. Well, I must say, I feel like my colleagues. I am devastated by the fact that with so much at stake we cannot seem to get, you know, to get off the dime. I do not happen—by the way, for one Senator's statement, [deleted] I think they would fold. If I were President, I would do exactly that. I would just beat the hell out of them. [Deleted.] I do not go with that at all for whatever it is worth. I think that is really shocking.

POSSIBILITY OF MORE IAEA INSPECTORS

The other thing I wanted to ask you is this. It seems to me to be critically important in this matter. Is there any way of beefing up the IAEA with more inspectors?

Mr. VEST. That is exactly what we have proposed, and with additional funds.

Senator JAVITS. Yes.

Mr. VEST. That is a part of our program.

Senator JAVITS. We are pushing that?

Mr. VEST. Yes, sir.

ARE WE PLAYING WHOLE RANGE OF ARGUMENT?

Senator JAVITS. When you say we are pushing this and pushing that, are we playing the whole range of the argument? Is Kissinger enough impressed with the way we feel about this, now? I happen to be the only member of this committee who is on Government Operations and Foreign Relations, and I am perfectly willing to throw my body across the dike as a bridge.

Is he impressed with the strength of our feeling so that we really—I think the country would back him. We would back him, in my judgment, if he played it right across the board, détente, nuclear arms limitation, [deleted], when they threaten to sink us. They will again just as they did before on the monetary situation in Europe. We are not going to give them those billions unless they come through on this.

Are we really prepared to make this a No. 1 priority?

Now, you ought to find out about that, and perhaps we even as a subcommittee, Mr. Chairman, could approach the administration on that score. I think we would be joined by the Government Operations Committee to really lean on this situation with everything we have because we feel so strongly about it.

Thank you, Mr. Chairman.

Senator SYMINGTON. Before going further—

Senator JAVITS. May I have one other question, please? I have forgotten one thing.

Senator SYMINGTON. Of course.

FREE WORLD'S SOURCE OF ENRICHED URANIUM

Senator JAVITS. Somebody said, and please confirm or deny this, that the United States is the sole supplier of enriched uranium to the free world. Now how does that hook into this thing?

Mr. VEST. I do not think that is true. Is it in your opinion?

Mr. OPLINGER. At the present time the United States and the Soviet Union both supply enriched uranium to the free world. That will not be true for very much longer. There are plants under construction in Europe which will come on the market in a few years.

Senator JAVITS. So that is no handle.

Mr. OPLINGER. No, sir.

Mr. VEST. No, sir.

Senator JAVITS. Thank you, Mr. Chairman.

CANADIAN RESUMPTION OF NUCLEAR AID TO INDIA

Senator SYMINGTON. Now ERDA is pretty deep in this situation, as you know. But before getting into that, I would ask unanimous consent to insert at this point in the record an article of Wednesday, March 10—this is last Wednesday—entitled "Canada To Resume Nuclear Aid to India," and in that connection, it appears that Canada will resume its aid to India and assist in completing the third Canadian built nuclear powerplant in India. The article says India has pledged not to use any plutonium produced in the three reactors supplied by Canada in any nuclear explosions.

[The information referred to follows:]

[From the New York Times, Mar. 10, 1976]

CANADA TO RESUME NUCLEAR AID TO INDIA

(By Robert Trumbull)

OTTAWA, March 9—India has accepted Canadian demands for certain strictures on its nuclear program, and Canada has agreed in return to resume nuclear aid.

According to a Canadian official, the new agreement, which is expected to be ratified soon by both governments, includes an Indian pledge that the three reactors supplied by Canada will not be used in developing an explosive device. The reactors, he said, will be subject to "adequate safeguards."

In return, the source said, Canada will reinstate a \$100-million-a-year assistance program, including limited nuclear aid, that had been suspended following the Indian nuclear explosion of May 1974 in which plutonium produced by a Canadian reactor was used.

It is believed that New Delhi has also agreed to refrain from exploding another nuclear device until the resumed Canadian nuclear aid program is completed 15 to 18 months from now.

However, the official source said that nothing in the new agreement prevented India from proceeding, after the Canadian project ends, with the development of nuclear explosives from non-Canadian resources.

Canadians in close touch with Indian scientific progress are convinced that New Delhi has all the technology needed, as well as the raw material in the form of uranium, to develop nuclear weapons without assistance from any country.

India is one of six countries that have produced a nuclear explosion. The others are the United States, the Soviet Union, Britain, France and China.

India, like France and China, has refused to sign the international treaty to prevent a spread of nuclear weapons. However, the Indians insist that their development of nuclear technology is for peaceful purposes.

The new nuclear agreement between Canada and India was worked out in New Delhi last week by teams led by Kewal Singh, the Indian Foreign Secretary, and Ivan Head, the chief foreign policy adviser to Prime Minister Pierre Elliott Trudeau.

Canadian officials are privately disturbed by the progress of the Indians in constructing their own reactors, which would be unaffected by the safeguards worked out recently by the United States, the Soviet Union, Canada, Britain, France, West Germany and Japan to prevent the nuclear technology that they export from being used for explosives.

SAFEGUARDS ARE SECRET

The nature of those safeguards is secret.

"India is one of half a dozen countries in the world with the reprocessing technique essential for the extraction of plutonium," a Canadian official said.

"There is no present indication that India is likely to stage a second explosion shortly," he added.

Canada is now negotiating with Pakistan in an attempt to forestall the possible use of wastes from a Canadian reactor near Karachi in a reprocessing plant purchased from France, thereby creating the raw material for a nuclear bomb.

Following inconclusive talks with Prime Minister Zulfikar Ali Bhutto in Ottawa last month, and subsequent discussions with Pakistani officials, Ottawa indicated that Canadian commitments to supply technological aid and fuel for the Karachi reactor would be halted unless Pakistan accepted the controls.

REACTOR SUPPLIES KARACHI

Canada has been reluctant to cease assistance with the reactor, since it supplies much of the electric power for Karachi, a major city.

Noting that the Indian nuclear explosion in 1974 used plutonium produced by a small Canadian research reactor, the Canadian official pointed out that the heavy water essential to the process was supplied by the United States.

While the research reactor cannot produce explosive material of weapons grade, the source said, the two large 400-megawatt reactors supplied to India by Canada can.

The first large reactor began producing a year and a half ago and the second is now "95 percent complete," the source stated. Under the new agreement, he said, Canada will resume the supply of components needed to have the machine fully activated 15 to 18 months from now.

LDC NUCLEAR POWER PROSPECTS

Senator SYMINGTON. I have here two extracts from a study conducted for ERDA [Energy Research and Development Administration] entitled, "LDC Nuclear Power Prospects, 1975-1990—Commercial, Economic and Security Implications."

The first extract outlines perceived weaknesses and problem areas in the international and safeguard area. The second includes recommendations on the U.S. approach to the nuclear market in less developed countries.

Would you have someone in the State Department analyze these two extracts and provide a written assessment of them for the record?

Mr. VEST. Yes, sir.

Senator SYMINGTON. Without objection they will be included in the record.

Incidentally, Mr. Vest, we would like to get this as soon as we can. You know, sometimes there is a long delay. If you need any assistance from ERDA in analyzing any of the details, why I think perhaps we could help you. Let us know if we could be of any service.

[The information referred to follows:]

Mr. VEST. Mr. James G. Poor, Director of the Division of International Security Affairs, ERDA, has provided the attached analysis and assessment for the record.

ERDA COMMENTS ON "LDC NUCLEAR POWER PROSPECTS, 1975-1990"

Pages V-50 to V-57 of the so-called Barber report identify what the authors consider to be nine weaknesses or problem areas of the NPT/IAEA system.

(1) Since there is no definition in the NPT of what constitutes "manufacturing" or a "nuclear weapon", it may be difficult to accuse a nation of non-compliance with the NPT.

Although there is no definition of a nuclear weapon in the NPT, Article II contains an undertaking by nonnuclear-weapon states party to the Treaty not to acquire "nuclear weapons or other nuclear explosive devices". It is clear from the words as well as the public record that the phrase "nuclear weapons or other nuclear explosive devices" is sufficiently broad to cover any nuclear devices which could be used for any explosive purposes. Taken in context of its history and purposes, there would appear to be an international consensus that the meaning of the term "manufacture" includes parts, fabrication and assembly. In addi

tion of safeguards. The objective of IAEA safeguards is the timely detection of manufacture nuclear weapons or nuclear explosives in order to allege a violation of safeguards. The objective of IAEA safeguards is the timely detention of materials diversion to nuclear weapons or other nuclear explosive devices or for "purposes unknown." Thus, any diversion of material constitutes grounds for an IAEA report that there has been non-compliance with the applicable safeguards agreement.

(2) The NPT does not prohibit all military uses of nuclear energy. Any nation can easily remove nuclear material from safeguards for immediate use in weapons or to stockpile weapon-grade material.

This point overlooks an important provision in NPT safeguards agreements. If a nation wishes to use safeguarded material for a non-proscribed military purpose, e.g. naval propulsion, it must make it clear that the use of material will not be in conflict with an undertaking the nation may have given and in respect of which Agency safeguards apply, that the nuclear material will be used only in a peaceful nuclear activity, and that during the period of nonapplication of safeguards the material will not be used for the production of nuclear weapons or other nuclear explosion devices. In addition, all U.S. Agreements for Cooperation contain specific guarantees by the cooperating nation against the use of nuclear material or equipment supplied by the U.S. for any military purpose, not only for explosives.

(3) The NPT permits stockpiling of nuclear material.

The NPT does not prohibit the storage of nuclear materials in nonnuclear-weapons states. These materials are, however, subject to international inspection and control. First, the materials are subject to IAEA safeguards. Second, U.S. Agreements for Cooperation contain controls over U.S.-supplied materials. The U.S. generally requires the reprocessing of U.S.-supplied materials be performed only in facilities acceptable to the U.S. or in facilities that the U.S. agrees can be effectively safeguarded.

The U.S. is also encouraging establishment of multinational fuel-cycle centers, which would decrease the number of storage sites.

(4) The present two year terms for IAEA inspectors are inadequate to provide the necessary background and training. Few states (particularly LDCs) have large numbers of experienced personnel from which the agency may draw. The IAEA has an inadequate number of inspectors, salaries are too low and there are language barriers.

Depending on the individual's background and experience when employed by the IAEA, he should develop into an increasingly effective inspector during a two-year term with the Agency. However, the Agency is not limited to retaining inspectors for only two years. The short initial contract allows the Agency an opportunity to evaluate inspectors. If an individual performs satisfactorily, he is offered a second two-year contract. At the end of the fourth year he may be offered a five-year contract.

LDC's are likely to have fewer experienced candidates for posts in the IAEA Department of Safeguards and Inspection, but there have been sufficient numbers available to assure a wide representation. As of the beginning of 1976, thirty-six nations were represented in this department. Further, inspectors from LDC's are not necessarily less qualified than inspectors from developed countries; in many cases they have received their educations at the same educational institutions. In addition, the Agency is developing a course to train personnel for national nuclear accounting systems. This course, which should begin in mid-1976, should create a reservoir of trained personnel for the Agency. A similar program is being considered by the U.S.

Agency salaries are no impediment to attracting and retaining qualified personnel. They are based on salaries paid by the U.N. Secretariat and are comparable to U.S. Civil Service salaries.

The number of inspectors is considered adequate for the number and type of inspections conducted by the IAEA at the present time. Steps are being taken to increase the number in the future as greater numbers of facilities become subject to safeguards. The Agency has been able in the past and should be able in the future to attract enough qualified people to the inspectorate to obtain the number of personnel required to meet its responsibilities effectively.

All personnel employed on the staff of the IAEA are required to have a working knowledge of English. Safeguards reports are required to be submitted in one of the four official languages of the Agency: English, Russian, French and Spanish. The state concerned is required to facilitate the examination of records

kept in a language other than the official languages. Little difficulty has been experienced by the IAEA with "language barriers" in carrying out its safeguards activities.

(5) It may be unlikely that an international mechanism based on national safeguards systems can be very effective.

Although the IAEA makes extensive use of national material-accountability systems, it does not depend on such systems to conduct its safeguards activities. The IAEA has the right and the capability to verify independently the integrity of nuclear materials. Inspection, containment and surveillance give the Agency this independent capability, and the Agency and its inspectors have access to facilities, reports and records in order to verify the findings of the national system. The maintenance of good national accounting systems is nevertheless important to the efficient operation of IAEA safeguards, and the Agency is giving strong emphasis to assisting members states in this regard.

The IAEA is not obliged to accept unsatisfactory national systems as the basis of safeguards. If it should consider a national system inadequate, it may determine that it is unable to apply safeguards effectively until the system is brought up to IAEA standards; in this case, U.S. bilateral safeguards would apply to U.S.-supplied material. Moreover, if a national system should become unsatisfactory, the Board of Governors can be notified that verification cannot be accomplished.

The IAEA is giving strong emphasis to assisting Member States in the establishment of adequate national accounting and control systems, and the U.S. has provided assistance to other nations in this regard. As already noted, the IAEA is planning a training program for national safeguards personnel, especially for the less developed countries engaged in or planning nuclear power programs. The first presentation of such a course is planned for mid-1976. Consideration is also being given within the Executive branch of the U.S. Government to establishing a course for such personnel under IAEA auspices.

(6) The international safeguards system, based solely on material balance accounting, may be inherently unable to ensure that no diversion of material has taken place.

No system can provide absolute assurance that no nuclear material has been diverted. However, the timeliness of detecting evidence of possible diversion and the relative comprehensiveness and reliability of independent IAEA materials measurements are two areas where improvements are being pursued. It is the judgment of U.S. and foreign safeguards experts who are intimately familiar with IAEA accountancy safeguards that it can detect and thus make an important contribution to deterring efforts at diversion by states. Nevertheless, as the volume of materials increases and as the number and complexity of safeguarded facilities grow, improved material accountability to provide more accurate and timely data will be essential. As the possibilities for more reliable measurements of fissionable materials reach practical limits, the importance of surveillance and containment measures will increase, necessitating further development in these areas. Both the IAEA and a number of its Member States, particularly the U.S., are developing instrumentation, procedures and advanced equipment to maximize the effectiveness of safeguards.

(7) & (8) The IAEA is not responsible for physical security of nuclear material and is therefore unable to meet the threat of theft or sabotage by subnational groups.

The IAEA's safeguards function, which has been agreed to by its member states, is solely to apply accountability and related inventory verification to nuclear material in order to provide for the timely detection of diversion of significant quantities of nuclear material and the deterrence of such diversion by risk of early detection. While the IAEA is also capable of detecting illicit acts by individuals, it has no authority to exercise any police functions in the physical protection area to prevent theft or sabotage by subnational or terrorist groups. Countries are extremely sensitive about such police functions, because they are viewed as a matter of national sovereignty. It should not be presumed that, because the IAEA has no authority to exercise physical-security functions, physical security is absent. States have a vital interest in protecting nuclear materials, whether or not such physical security is supervised by an international agency.

International concern for the physical protection of nuclear materials has increased markedly in recent years. In 1972, the IAEA sought from a panel of experts recommendations for physical protection of nuclear materials. These recommendations were made available by the Agency to Member States for guidance

in establishing national physical-security programs. The IAEA has continued to emphasize the importance of physical security in national safeguards programs and, in 1975, reviewed and updated its earlier recommendations.

The U.S. has also been in the forefront in working toward the adoption of adequate physical security on a world-wide basis. The U.S. imposes physical security assurance requirements on its exports of trigger quantities of highly enriched uranium, plutonium and uranium-233.

The U.S. is also encouraging effective measures in other countries through bilateral exchanges of information, by its support of an international convention on physical security and by its own physical protection policies and its research and development efforts. The U.S. has found not only a world-wide recognition of the need for adequate physical security but also active steps being taken by other nations to assure adequate physical security.

(9) The IAEA would find it difficult, in the case of a suspected diversion, to provide a timely response.

If the IAEA is unable to verify independently by routine inspection that material subject to IAEA safeguards has not been diverted, the Agency may initiate special inspections, and request the nation to take corrective measures it considers necessary; if verification continues to be unattainable, non-compliance actions may be initiated by the Board of Governors. Such procedures include notification to Member States of the IAEA (which may then invoke non-compliance rights contained in bilateral agreements) and to the U.N. Security Council and General Assembly. It is the judgment of U.S. and foreign safeguards experts that the IAEA safeguards system will provide timely detection of diversion and thus make an important contribution to deterring diversion. However, the U.S. recognizes that improvements are both necessary and possible, in light of the agency's growing safeguards responsibilities, and U.S. and other countries are working closely with the Agency to ensure that it possesses not only the necessary technical and financial resources, but also the political support to carry out its responsibilities effectively.

Comments on pp. V-81-V-91.

Based on the authors' assessment of the size of the LDC market and the safeguards and political issues posed by it, the Barber Report makes a number of recommendations on the U.S. orientation toward the LDC market.

The report makes the following general recommendations (1) the development of the LDC nuclear power export market ought to proceed in a most conservative manner and no steps should be taken that would encourage unfortunate forms of international competition by means of an indiscriminate "dash" to exploit a presumed large LDC market, (2) development of an artificial LDC nuclear market through large scale subsidization on a direct or hidden basis should be avoided, and (3) special concessionary arrangements to specific LDCs should be carefully reviewed. (4) Article IV of the NPT should be interpreted as obliging the U.S. (or other nuclear powers) to develop nuclear power facilities in LDC's only if such assistance can be reasonably supported on economic terms, taking into account national development objectives and energy sector conditions and (5) Nuclear energy exports to LDCs should be carefully reviewed in the context of the total needs of LDC's and the full range of other energy assistance alternatives that the U.S. might provide.

It has not been, and is not now, the policy of the U.S. Government to promote nuclear exports on an indiscriminate basis. Under the U.S. system of export controls, nuclear reactors and special nuclear material may only be licensed for export after an Agreement for Cooperation has been concluded between the U.S. and the recipient nation or group of nations. Agreements for Cooperation, which are submitted to Congress, contain guarantees by the recipient nations or international organizations that stipulated safeguards will be maintained and that no material or equipment supplied by the U.S. under the agreement will be used for nuclear weapons or for research on, or development of, nuclear weapons or for any other military purpose. In addition, export licenses for source material, special nuclear material or production and utilization facilities may be issued by the Nuclear Regulatory Commission only after consideration of the views of the Executive branch that the export would not be inimical to the common defense and security. In addition, before the Export-Import Bank of the United States approves financial support for U.S. nuclear exports, it determines, *inter alia*, whether the proposed transaction is economically viable and technically feasible. The U.S. is also working closely with other major nuclear exporting nations to avoid a competition based on minimizing safeguards requirements

and to devise a common set of standards concerning safeguards and other related controls associated with peaceful nuclear exports.

At the same time, it has been and continues to be the policy of the U.S. Government to cooperate with other nations in the peaceful uses of atomic energy and to fulfill its obligations under Article IV of the Treaty on the Non-Proliferation of Nuclear Weapons.

Article IV asserts the "inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes", and provides that "Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of the non-nuclear weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world." This article was sought by the non-nuclear-weapon states as a condition for their support of the NPT. The language of this article, especially in the context of the negotiation of the NPT, clearly expresses the obligation of the nuclear-weapon states, as well as non-nuclear weapon states in a position to do so, to cooperate in the development of peaceful nuclear programs in the non-nuclear-weapon States Party to the Treaty. (This obligation was reaffirmed at the NPT Review Conference in 1975.) Increasingly these programs include plans for the use of nuclear power to help meet energy needs.

The specific mix of energy technologies a given country chooses to meet its energy needs will depend on a number of factors including: its indigenous resources, energy needs, trade balance, environmental standards, the flexibility of the energy utilization infrastructure, and the amount of capital it is prepared to invest in new systems, in addition to the normal workings of the market. No one energy source will be optimal for every country. And, indeed, no country is likely to be willing to be solely dependent on any one energy source. The U.S. is not in a position to make nuclear cooperation conditional upon its own unilateral assessment of the "national development objectives and energy sector conditions" of the nation seeking to advance its nuclear program. That assessment is properly made by the importing nation. However, by encouraging the establishment of multinational fuel-cycle centers, the U.S. is seeking to discourage countries with small nuclear power programs from developing small, high-cost, national facilities, particularly reprocessing plants.

The U.S. is also active in facilitating the exchange of a variety of energy technologies among countries and is proceeding to develop a number of energy alternatives on a priority basis. While motivated primarily by domestic goals, these technologies which are ultimately commercialized will be available on the international market.

The Barber report also made various recommendations on means of influencing the LDC market to improve safeguards conditions. These included: (1) Provision for U.S. low-enrichment-fuel production capabilities to ease LDC's concern over security of supply, a major reason for their leaning to other suppliers or for considering plutonium recycle. (2) development of long-term storage facilities for spent fuel rods and equitable compensation or fuel credits which could considerably reduce pressures for independent LDC reprocessing systems and (3) standardization of fuel cycles and larger-scale nuclear centers through regulation of plutonium recycling.

It is true that the ability of the United States to influence foreign nuclear power development in directions favorable to U.S. interests is being seriously limited by our inability to assure the supply of enrichment services for additional nuclear power reactors abroad.

The President has proposed the Nuclear Fuel Assurance Act both to assure the necessary increase in U.S. enrichment capacity and to enable the U.S. to reassert its leadership position in international nuclear cooperation. Early passage of this act will not only help the United States maintain and further its influence to discourage the proliferation of nuclear weapons, but it will also support U.S. efforts to promote international cooperation in developing global solutions to the energy problems besetting most nations of the world.

The U.S. is also encouraging the development of multinational fuel-cycle centers involving management, operation and perhaps ownership by more than one nation. Such centers, which would include spent-fuel storage facilities, would discourage the development of small, high-cost national recycle facilities and would provide additional assurances against unilateral abrogation of non-proliferation and safeguards undertakings. The co-location of fuel fabrication plants, would also facilitate the application of international safeguards and physical-security measures. There are, of course, many unresolved questions and practical difficulties that would be involved in the establishment of a center of such size and complexity. Although none of these appear insuperable, they will require careful analysis and strong commitments by many nations to resolve them. The U.S. is providing significant technical and financial assistance to the IAEA in support of a major study to assess some of the organizational, financial, legal, economic and technical aspects of the regional fuel cycle center concept. The U.S. is also urging other countries to initiate discussions of the potential of the multinational concept to meet these needs.

REGULATIONS GOVERNING REPROCESSING ENRICHMENT AND HEAVY WATER
PRODUCTION TRANSFER

Senator SYMINGTON. In his testimony before the Senate Government Operations Committee on March 9, Secretary Kissinger said that the executive branch instituted in 1972 special regulations governing proposed transactions involving reprocessing enrichment and the heavy water production activities.

Do you know what are the provisions of these special regulations?

Mr. VEST. I would have to get them, sir. But the effect of them is to make it impossible for U.S. firms to sell them to other countries without U.S. Government authorization.

Senator SYMINGTON. Would you supply the details for the record?

Mr. VEST. Yes, sir.

Senator SYMINGTON. Have there been any amendments to the special regulations since 1972?

Mr. VEST. I will provide that for the record.

Senator SYMINGTON. You do not know that yourself?

Mr. VEST. No, sir, I do not.

Senator SYMINGTON. Would you provide to the committee the text of the special regulations plus any amendments which I have asked for and which you said you would do?

Mr. VEST. Yes, sir.

[The information referred to follows:]

SPECIAL REGULATIONS GOVERNING REPROCESSING ENRICHMENT AND HEAVY WATER
PRODUCTION TRANSFERS

[Supplied by Department of State]

The only amendment made to these regulations (10 CFR Part 810) since 1972 has been the provision for a determination that activities which constitute directly or indirectly engaging in the production of any special nuclear material outside the United States will not be inimical to the interest of the United States, and are authorized by the ERDA Administrator, provided such activities are limited to the furnishing of information which is available to the public in published form or which will be made available to the public in published form within 60 days after the furnishing thereof. A copy of 10 CFR Part 810 is attached.

[From the Federal Register, Vol. 40, No. 190—Tuesday, September 30, 1975]

RULES AND REGULATIONS

Title 10—Energy

CHAPTER III—ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

PART 125—PERMITS FOR ACCESS TO RESTRICTED DATA

RESTRICTED DATA ON LITHIUM ISOTOPE SEPARATION

Correction

In F.R. Doc. 75-25209 appearing on page 43481 of the issue for Monday, September 22, 1975, the added subcategory now designated "(d)" should be designated "(e)".

PART 810—UNCLASSIFIED ACTIVITIES IN FOREIGN ATOMIC ENERGY PROGRAMS

A new Part 810 is added to 10 CFR to read as follows:

Sec.	
810.1	Purpose.
810.2	Scope.
810.3	Definitions.
810.4	Communications.
810.5	Interpretations.
810.6	Authorization requirement.
810.7	Generally authorized activities.
810.8	Grant and revocation of specific authorization.
810.9	Contents of application.
810.10	Reports.
810.11	Additional information.
810.12	Violations.
810.13	Effective date.

AUTHORITY: Secs. 57, 161, 68 Stat. 932, 948, as amended; 42 U.S.C. 2077, 2201; sec. 104, Pub. L. 93-438 (October 11, 1974), sec. 223, 68 Stat. 958, as amended; 42 U.S.C. 2273, §§ 810.10 and 810.11 issued under sec. 161o., 68 Stat. 950, as amended; 42 U.S.C. 2201(o).

§ 810.1 Purpose.

The regulations in this part incorporate a general authorization made by the Administrator under section 57.b.(2) of the Atomic Energy Act of 1954, as amended (78 Stat. 605); establish reporting requirements applicable to persons who engage in certain unclassified activities in foreign atomic energy programs; and establish procedures governing applications for specific authorizations to engage directly or indirectly in the production of special nuclear material outside the United States.

§ 810.2 Scope.

The regulations in this part apply to all persons within or under the jurisdiction of the United States.

§ 810.3 Definitions.

As used in this part:

(a) "Act" means the Atomic Energy Act of 1954 (68 Stat. 919) including any amendments thereto.

(b) "Agreement for cooperation" means an agreement for cooperation with any nation or regional defense organization pursuant to section 123 of the Act.

(c) "Atomic weapon" means any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separate and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, or weapon prototype or a weapon test device.

(d) "Administration" means the United States Energy Research and Development Administration.

(e) "Administrator" means the Administrator of the United States Energy Research and Development Administration.

(f) "Defense information" means any information in any category determined by any Government agency authorized to classify information, as being information respecting, relating to, or affecting the national defense.

(g) "Nuclear reactor" means an apparatus, other than an atomic weapon, designed or used to sustain nuclear fission in a self-supporting chain reaction.

(h) "Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Administration, any State or any political subdivision of, or any political entity within a State; and (2) any legal successor, representative, agent or agency of the foregoing.

(i) "Research and development" means (1) theoretical analysis, exploration, or experimentation; or (2) the extension of investigative facilities and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of motors, devices, equipment, materials, and processes.

(j) "Restricted Data" means all data concerning (1) design, manufacturing or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include any data declassified or removed from the Restricted Data category pursuant to section 142 of the Act.

(k) "Source material" means source material as defined in the regulations contained in 10 CFR, Part 40.

(l) "Special nuclear material" means special nuclear material as defined in the regulations contained in 10 CFR, Part 70.

(m) "United States", when used in a geographical sense, includes all territories and possessions of the United States, the Canal Zone and Puerto Rico.

§ 810.4 Communications.

All communications concerning the regulations in this part should be addressed to the Administrator, Energy Research and Development Administration, Washington, D.C. 20545, Attention: Division of International Security Affairs. Communications and reports may be delivered in person at the Administration's main offices in Washington, D.C. or Germantown, Maryland.

§ 810.5 Interpretations.

Except as specifically authorized by the Administrator in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Administration other than a written interpretation by the General Counsel will be recognized to be binding upon the Administration.

§ 810.6 Authorization requirement.

Section 57b. (2) of the Act, as implemented by the Energy Reorganization Act of 1974, provides that it shall be unlawful for any person to engage directly or indirectly in the production of any special nuclear material outside of the United States except (a) under an agreement for cooperation made pursuant to section 123 of the Act, or (b) upon authorization by the Administrator after a determination that such activity will not be inimical to the interest of the United States.

§ 810.7 Generally authorized activities.

(a) Pursuant to section 57b.(2) of the Act, the Administrator has determined that any activity which constitutes directly or indirectly engaging in the production of any special nuclear material outside of the United States will not be inimical to the interest of the United States and is authorized by the Administrator, provided that it:

(1) Does not constitute directly or indirectly engaging in any such activity in any of the following countries or areas:

Albania;
 Bulgaria;
 China, including Manchuria (and excluding Taiwan (Formosa)) (includes Inner Mongolia; the provinces of Tsinghai and Sikang; Sinkiang; Tibet; the former Kwantung Leased Territory, the present Port Arthur Naval Base Area and Liaoning province);
 Viet-Nam;
 Cuba;
 Czechoslovakia;
 East Germany (Soviet zone of Germany and the Soviet Sector of Berlin);
 Estonia;
 Hungary;
 Latvia;
 Lithuania;
 North Korea;
 Outer Mongolia;
 Poland;
 Rumania;
 Union of Soviet Socialist Republics;

and

(2) Does not constitute directly or indirectly engaging in any of the following activities outside of the United States :

(i) Designing or assisting in the design of facilities for the chemical processing of irradiated special nuclear material, facilities for the production of heavy water, facilities for the separation of isotopes of uranium, or equipment or components especially designed for any of the foregoing ; or

(ii) Constructing, fabricating, or operating such facilities ; or

(iii) Constructing, fabricating, or furnishing equipment or components especially designed for use in such facilities ; or

(iv) Training foreign personnel in the design, construction, fabrication, or operation of such facilities or equipment or components especially designed therefore ; or

(v) Furnishing information not available to the public in published form¹ for use in the design, construction, fabrication or operation of such facilities or equipment or components especially designed therefore ; and

(3) Does not involve the communication of Restricted Data or other classified defense information ; and

(4) Is not in violation of other provisions of law.

(b) Pursuant to section 57.b(2) of the Act, the Administrator has determined that any activity not generally authorized pursuant to paragraph (a) of this section, which constitutes directly or indirectly engaging in the production of any special nuclear material outside of the United States, will not be inimical to the interest of the United States, and is authorized by the Administrator, provided that it :

(1) Does not involve the communication of Restricted Data or other classified defense information ; and

(2) Is not in violation of other provisions of law ; and either.

(3) Is limited to participation in (i) meetings or of conferences sponsored by educational institutions, laboratories, scientific or technical organizations ; (ii) international conferences held under the auspices of a nation or group of nations ; or (iii) exchange programs approved by the Department of State ; or

(4) Is limited to the furnishing of information which is available to the public in published form² or which will be made available to the public in published form within 60 days after the furnishing thereof.

§ 810.8 Grant and revocation of specific authorization.

(a) Any person who proposes to engage directly or indirectly in the production of special nuclear material outside of the United States may apply, unless such proposed activity is authorized pursuant to an agreement for cooperation or is authorized by § 810.7, for a specific authorization to the Energy Research and Development Administration, Washington, D.C. 20545, attention: Division of International Security Affairs.

(b) The Administrator will approve an application for a specific authorization to engage directly or indirectly in the production of special nuclear material outside of the United States by conducting any of the activities enumerated in § 810.7(a) if, after taking into account following factors, he determines that such activity will not be inimical to the interest of the United States :

(1) Whether the United States has an agreement for cooperation with the country in which the proposed activity will be conducted ;

(2) Whether the country in which the proposed activity will be conducted is a party to the treaty on the Nonproliferation of Nuclear Weapons (NPT) and, pursuant thereto, has entered into an agreement with the International Atomic Energy Agency (IAEA) for the application of safeguards to its peaceful nuclear activities ;

(3) Whether the country in which the proposed activity will be conducted, if not a party to the NPT, will accept IAEA safeguards with respect to the project ;

(4) The relative significance of the proposed activity and availability of comparable assistance from other sources ; and

(5) Any other fact which may bear upon the political, economic, or security interests of the United States.

(c) An authorization pursuant to this § 810.8 may be revoked, suspended, or modified, in whole or in part ;

¹ For purposes of this section, "information which is available to the public in published form" shall include, but not be limited to any information contained in an application filed in accordance with the regulations of the U.S. Patent Office and eligible for foreign filing under 35 U.S.C. 184. In addition, information which is available from the Administration pursuant to 5 U.S.C. 552 shall, for purposes of this section, be deemed to be information available to the public in published form.

² *Ibid.*

(1) For any material false statement in the application for an authorization or in any additional information submitted pursuant to § 810.11, or

(2) If the Administrator finds that the conduct of any or all of the authorized activities would be inimical to the interest of the United States.

§ 810.9 Contents of application.

(a) Each application shall contain the following information:

(1) The full name, address and citizenship of the applicant. If the applicant is a corporation or other entity, it shall indicate the State where it was incorporated or organized, the location of the principal office, and shall furnish information known to the applicant concerning the control or ownership, if any, exercised over the applicant by any alien, foreign corporation or foreign Government. Each application shall contain complete and accurate disclosure with respect to the real party or parties in interest.

(2) A complete statement of the activity for which Administration authorization is requested, including designation of the country or countries involved and a detailed description of the specific project to which such activity relates.

(b) If the application contains restricted data or other defense information, it shall be prepared in such manner that all restricted data and other defense information are separated from the unclassified information.

(c) Information contained in applications, statements or reports otherwise filed by the applicant with the Administration may be incorporated by reference, provided that each such reference is clear and specific.

§ 810.10 Reports.

(a) Except as provided in paragraph (c) of this section, each person who engages in an activity specified in paragraph (b) of this section shall within 30 days from the commencement of such activity submit a report to the Energy Research and Development Administration, Washington, D.C. 20545. Attention: Division of International Security Affairs. Each such report shall contain the following information:

(1) The name, address and citizenship of the person submitting the report;

(2) The name, address and citizenship of the person or persons for whom such activities are performed;

(3) A description of the activity, including its locations.

(b) Activities to be reported;

(1) The design, construction, or operation, outside the United States, of:

(i) A nuclear reactor; or

(ii) A facility for the separation of isotopes of plutonium; or

(iii) A facility for the chemical, physical or metallurgical processing or fabrication or alloying of special nuclear material; or

(iv) A facility for the production of zirconium (hafnium-free or low-hafnium), reactor-grade graphite, or beryllium; or

(2) The design or fabrication outside the United States, of any component part especially designed or fabricated for a nuclear reactor or other facility specified in subparagraph (1) of this paragraph; or

(3) The furnishing of designs, drawings, or other technical data for use outside the United States in the construction or operation of a facility specified in subparagraph (1) of this paragraph or in the fabrication of a component part specified in subparagraph (2) of this paragraph; or

(4) The separation, outside of the United States, of isotopes of uranium or plutonium, or

(5) The production, outside of the United States, of heavy water, zirconium (hafnium-free or low-hafnium), reactor-grade graphite, or beryllium; or

(6) The chemical, physical or metallurgical processing of fabricating or alloying, outside the United States, of special nuclear material.

(c) The reporting requirements of this section shall not apply to:

(1) Any activity consisting only of (i) the communication of information generally available to the public in published form; or (ii) financial assistance; or (iii) the transmittal of information relating only to conceptual design or performance characteristics of nuclear reactors or facilities; or (iv) the comparative evaluation of types of reactors or facilities; or (v) any combination of the foregoing.

(2) Any person to the extent that such person engages in activity authorized by § 810.7 as the employee of a person required to submit a report pursuant to paragraph (a) of this section.

(3) Any activity specifically authorized by the Administrator.

§ 810.11 Additional information.

The Administration may at any time require any person who engages in activity specified in § 810.10 to submit additional information with respect to such activity.

§ 810.12 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the act or any regulation or order issued thereunder. Any person who wilfully violates any provision of the act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

§ 810.13 Effective date.

The regulations in this part are effective September 30, 1975.

NOTE.—The reporting requirements contained herein have been approved by the Office of Management and Budget in accordance with the Federal Reports Act of 1942.

Dated at Washington, D.C., this 23rd day of September, 1975.

For the Energy Research and Development Administration.

EDWARD B. GILLS,
*Acting Assistant Administrator
for National Security.*

[FR Doc. 75-26044 Filed 9-29-75; 8:45 am]

DIFFERENCE BETWEEN SUPPLIERS AGREEMENT AND SPECIAL REGULATIONS

Senator SYMINGTON. Comparing the special regulations with the supplies agreement, what in general are the differences in restrictions?

Mr. VEST. The general difference, very quickly, is that while we do not sell, the other countries can.

VIOLATIONS OF U.S. BILATERAL SAFEGUARDS

Senator SYMINGTON. Secretary Kissinger said that if U.S. bilateral safeguards on nuclear materials were violated, our bilateral agreements call for halting further assistance.

Have any such violations occurred?

Mr. VEST. Not to my knowledge, sir.

Senator SYMINGTON. Would you find out if they have?

Mr. VEST. I will check that, sir.

Senator SYMINGTON. And then would you add what we have done about it?

Mr. VEST. If they have ever happened. I am not aware that they have.

Senator SYMINGTON. OK. Thank you.

If such violations occur, would further assistance be halted automatically?

Mr. VEST. I would have to check, sir, and see what would happen if it is left open or if it is specified.

Senator SYMINGTON. Would you do that?

Mr. VEST. I will do that.

[The information referred to follows:]

VIOLATIONS OF U.S. BILATERAL SAFEGUARDS

[Supplied by Department of State]

Under U.S. bilateral Agreements for Cooperation, specific provisions generally exist for handling non-compliance, such as violations of safeguards, including the right to suspend or terminate the Agreement and to require return of

materials, equipment and devices transferred under it. A material breach of an agreement would constitute cause for exercising these rights, as is well understood by the parties, but no agreement specifies that such actions would be taken automatically.

In a situation where a nation would be in non-compliance with a bilateral U.S. agreement and would not take remedial action within a reasonable period of time, the U.S. would most likely halt all further assistance forthwith. For a country increasingly reliant upon the U.S. for development of its civil nuclear energy option, such withdrawal of U.S. assistance would be viewed as a significant disincentive to diversion or other non-compliance relating to safeguards.

STUDY OF MULTINATIONAL NUCLEAR FUEL CENTERS CONCEPT

Senator SYMINGTON. In response to the questions at the Government Operations Committee hearings, Secretary Kissinger appeared to imply that the State Department is not making any study of the concept of multinational nuclear fuel cycle centers as a means to control the spread of the critical steps in the fuel cycle. He said the State Department is waiting for the IAEA to complete its study.

Did he mean that even though he first advocated investigating the idea back in September 1974 that the U.S. State Department has done nothing since then to study the pros and cons of the idea?

Mr. VEST. An actual study on the extent and feasibility of it is underway both in IAEA and, it is my belief, in ACDA as well.

Mr. OPLINGER. Yes, sir.

Mr. VEST. And we have been in touch with both places on the costs of this particular effort.

Senator SYMINGTON. Well, it has been a year and a half. How long is it going to take now?

Mr. VEST. I do not know, sir.

Senator SYMINGTON. What would you guess?

Mr. VEST. I have no idea. I would have to provide that for the record.

Senator SYMINGTON. It cannot be very high on the scale of priorities in the Department of State, would you not agree to that, that is, if it has been going for a year and a half?

Mr. VEST. Not being a party to the study, sir, I do not know.

[The information referred to follows:]

STUDIES OF MULTINATIONAL OR REGIONAL NUCLEAR FUEL CYCLE CENTER CONCEPT

(Supplied by Department of State)

The IAEA has undertaken a comprehensive study of regional multinational nuclear fuel cycle centers (MNC's). The study includes an analysis of the economics of co-locating several segments of the "back-end" of the fuel cycle (e.g. spent fuel storage and reprocessing, mixed oxide fuel fabrication, radioactive waste management), as well as an exploration of the institutional, legal and financial possibilities that exist for organizing these centers. The U.S. has actively supported the Agency study project by supplying financial contributions and expert-consultants, and by advocating broad support for the study of the multinational concept in many international fora. The Agency plans to have a preliminary draft of its report by the end of this year, and expects to have the final report in time for the Salzburg Fuel Cycle Conference in April, 1977.

The MNC idea has also been under study in the U.S. government for about one year. It is a complex concept with important technical, political and economic aspects that cut across commercial nuclear industry as well as governmental policy lines, and it requires sensitivity to the interests of potential participants, including both supplier and recipient countries. A preliminary

interagency study of the MNC idea, chaired by ACDA, was completed in September of 1975. Since that time efforts to bring other countries to consider the MNC approach have proceeded in parallel with internal efforts to study separate elements of the problem. Some issues receiving particular attention include questions related to siting an MNC (such as the political, geographical, geological, and economic factors involved), analysis of various spent fuel storage options, and exploration of international solutions to the radioactive waste management problem that might serve as an incentive for MNC participation.

Some MNC studies have continued on an interagency basis, some have been pursued separately by ACDA, and in a limited number of cases, ACDA plans to use external research funds to address particular problems related to the MNC concept. It is expected that study and analysis will continue in support of on-going bilateral and multilateral discussions of the MNC, and that they will become more specific in focus as these discussions advance.

The IAEA reached the preliminary conclusion that regional nuclear fuel cycle centers, involving significant economies of scale, offer the possibility of increased efficiency and decreased cost as compared to dispersed national facilities. This preliminary study led the Agency to undertake the larger study discussed above. The U.S. Government analysis to date also suggests that MNCs could offer advantages in security, safety, materials accountancy and economy, all of which, in turn, would be highly preferable to national reprocessing plants from the perspective of non-proliferation.

LACK OF INTEREST IN PROBLEM AND CLASSIFICATION

Senator SYMINGTON. Inasmuch as this is probably the most important problem that faces the world today, why can't we get more interest in the State Department? Why does there seem to be such a lack of interest?

Mr. VEST. I really cannot say, sir, because I have been working on this for the last year, and I have been very interested in it.

Senator SYMINGTON. Well, you have sure—

Mr. VEST. And I have never had any trouble in getting to the Secretary of State on any issues connected with this.

Senator SYMINGTON. We would like to pursue some of these issues in public; but this hearing is classified, you see, so we get into the same kind of situation that we were in before. When it busts out, I do not know who will take the responsibility for it.

You know, we are getting a little tired of this rigamarole.

Mr. VEST. The only part where I have had to ask for classification is in respect to the nuclear suppliers' negotiations. Much of the rest of this, sir, has never been classified, and when the Secretary went to appear before the Joint Committee on Atomic Energy, I was away, but I assumed much of this would come out of that.

IAEA STUDY OF NUCLEAR FUEL CENTER CONCEPT

Senator SYMINGTON. When do you think the IAEA study will be finished?

Mr. VEST. I will have to answer that later, sir. I will look into it. I don't know.

[As of the date of publication, the information referred to had not been supplied.]

Senator SYMINGTON. Have you ever asked?

Mr. VEST. No, sir, I have not.

Senator SYMINGTON. So, it is not on your highest priority, either, is it?

Mr. VEST. Any study being done by a multinational group—I don't ask.

Senator SYMINGTON. Is the United States an active participant in the IAEA study?

Mr. VEST. Well, I do not know about that, sir.

Mr. OPLINGER. Yes, sir, we are.

Senator SYMINGTON. Well then, how about you? Do you know when it will be finished—roughly?

Mr. OPLINGER. The original projection about 6 months ago, I think, was that it might take as long as 2 years. We have been pressing for a much earlier conclusion.

Senator SYMINGTON. Excuse me, sir. What is your name, since you are testifying?

Mr. OPLINGER. My name is Gerald Oplinger. I am Deputy Director of the Office of Nuclear Policy in Mr. Vest's Bureau.

Senator SYMINGTON. I thank you. I thought it would be well to have for the record.

Have you reached any tentative conclusions yet?

Mr. OPLINGER. No, sir. I do not think that there are any conclusions that have been reached yet.

DID SECRETARY KISSINGER DISCUSS GERMAN SALES IN BRAZIL

Senator SYMINGTON. Has Secretary Kissinger discussed the subject of the German sale of the complete fuel cycle to Brazil, which in my opinion, incidentally, having been in this business for some 30 years in Government, is the single most dangerous thing that has happened to the peace of the world since World War II; was it brought up for discussion by the Secretary when he was in Brazil?

Mr. VEST. I do not know, sir.

Senator SYMINGTON. Will you find out for the record?

Mr. VEST. We will inquire for the record.

Senator SYMINGTON. Then, if you do not know, you do not know what the response was, either?

Mr. VEST. No, sir.

Senator SYMINGTON. Would you find out for the record about that, too?

Mr. VEST. Yes; we will see what it was.

Senator SYMINGTON. I do not mean to be pesky or sarcastic about it. We just want to know. We have to find out about this.

Mr. VEST. I understand, sir.

[As of the date of publication, the information referred to had not been supplied.]

IMPORTANCE OF SUBJECT AND GETTING INFORMATION OUT

Senator SYMINGTON. I think it is as I said many times and will say again; it is the most important problem that the people of the world face today.

Today I had lunch with an expert in this field, and they have found cancer of the thyroid 300 miles from the original detonation at Eniwetak. We have a pamphlet that Dr. Iklé published. The Hiroshima bomb was 13 kilotons and killed 85,000 people, and in the same published pamphlet the Director of the Arms Control Agency said that the biggest one that was dropped was dropped by the Soviets, and that was a little bigger than 13,000 tons. It was 58 million tons.

This thing has to be looked at, and you are all meeting in some club in London and not doing anything about getting the word out to the people [deleted.] I completely agree with the able Senator from New York. I cannot buy that kind of discussion. I am beginning to wonder whether we want to get the information out, because if we got it out, I could tell you one thing it would do. It would very much change the arms proposals that are being presented to the Congress today.

Mr. VEST. Sir, if I could just say one thing. I participated in the negotiations, and I argued on behalf of getting it out. So, there is no question about us not wanting to get this out because at each meeting I raised the subject.

Senator SYMINGTON. Well, it looks to me like the operation was successful, but the patient is either dying or dead as far as any control of proliferation goes.

DISALLOWING NUCLEAR EXPORTS TO NON-NPT SIGNATORY

What is the administration's response to the proposal that the United States establish a law or policy that would disallow any nuclear exports to countries which do not sign the Non-Proliferation Treaty?

Mr. VEST. I think our position is that this is not the best way to deal with the issues involved. Some countries, there are a number of countries that have not, for one reason or another, either signed or ratified the NPT, and we do not think, in some cases we think this might be cutting off our nose to spite our face in this particular way, even though we do advocate the broadest possible adherence to the NPT.

Senator SYMINGTON. I think there is merit in what you say. But on the other hand it shows what you might say is the impotency of the IAEA and the Non-Proliferation Treaty.

PROPOSED INTERNATIONAL CONVENTION ON PHYSICAL SECURITY

We understand the United States has proposed an international convention on physical security, nuclear material and facilities.

What is the status of this proposal?

Mr. VEST. At this stage it is still a proposal. It has not been fleshed out and pursued as yet.

Senator SYMINGTON. Has it been given to anybody, or is it just inside, we proposing it to ourselves?

Mr. VEST. It is still being studied inside us.

Senator SYMINGTON. That is a very fine way to get other people to cooperate with it.

Mr. VEST. [Deleted.]

POSSIBILITY OF IAEA PHYSICAL SECURITY STANDARDS

Senator SYMINGTON. Do you think there is any likelihood that the IAEA will establish and require minimum physical security standards on its members?

Mr. VEST. I do not know what the IAEA might do, sir.

Senator SYMINGTON. Would you want to guess?

Mr. VEST. No, sir. I am not guessing—not on any multinational body. We are trying to do something about it.

Senator SYMINGTON. When we are operating in total ignorance, and we are in total ignorance, and you are partially ignorant, and when we ask for a guess and you can't, please do not be upset with us for that.

Mr. VEST. I would be very happy to try to answer that for you for the record.

[The information referred to follows:]

POSSIBILITY OF REQUIRED IAEA PHYSICAL SECURITY STANDARDS

[Supplied by Department of State]

The IAEA has recently published a booklet entitled "The Physical Protection of Nuclear Material" (INFCIRC/225). [The booklet referred to is in the Committee files.] It contains detailed recommendations for physical security measures to be taken by member states in maintaining and improving the protection of nuclear materials in use, storage and transit. Steps are being taken to encourage members to use these recommendations, but no mandatory requirements to apply them exist.

The IAEA has no statutory authority for compelling compliance on physical security standards, nor is it likely that members would agree to grant the IAEA such authority. Sovereign nations are naturally reluctant to grant police powers to international organizations for application within areas that fall under domestic jurisdiction. However, all states naturally have an interest in protecting potentially dangerous materials from theft and sabotage, and the IAEA's physical security recommendations are expected to receive wide consideration.

At upcoming meetings, the nuclear suppliers will also be considering common physical security requirements to be imposed on their transfers of nuclear equipment and materials. The levels of physical protection to be required are expected to take account of international recommendations such as those of the IAEA.

Senator SYMINGTON. You have been very fine and forthright, but we intend to get this information; I intend to see this thing through.

INCENTIVES FOR JOINING NPT

While the supplier nations are willing to sell to non-NPT countries almost anything a country wants—for example, West Germany and Brazil—what real incentives are there for any nation to join the NPT?

Mr. VEST. The real incentive for a country to join the NPT is if they are afraid of nuclear proliferation, that they will try to do whatever will hamper it, and NPT is one more way in which to try to build a structure that will deter people from proliferating.

Senator JAVITS. Well, I do not want to add to the administration's arguments, but is not another argument the claim on the nuclear powers that if there is some difficulty, at least there is a moral claim, would you not say that?

Mr. VEST. Yes.

Senator JAVITS. It was a big argument for the original NPT.

Mr. VEST. Yes.

CANADIAN SAFEGUARD CONDITIONS CONCERNING PAKISTAN

Senator SYMINGTON. Do you know any details about the safeguard conditions Canada is trying to impose on its cooperation with Pakistan?

Mr. VEST. Not as yet, sir.

[Deleted.]

PRESENT UNITED STATES AND CANADIAN SUPPLIER MOVES CONCERNING
INDIA

Senator SYMINGTON. The United States is presently reviewing an export license application to export nuclear fuel to India. Canada is resuming its cooperation with India in building power reactors.

Do not these moves by the suppliers indicate to the other possible "proliferative" nations that there will really be no long-term disruption to a country's nuclear program, that there will be no tough sanctions if they should set off a nuclear explosion?

Mr. VEST. You could look at it another way, and that is the very fact that there is so much trouble about doing anything for India shows that it is not easy, and there are potential sanctions. As far as Canada is concerned, that is exactly the state they are in right today.

IS NUCLEAR WEAPONS DEVELOPMENT CAPABILITY EXPANDING?

Senator SYMINGTON. In the last year, have any nations moved closer to the decision for capability to begin a nuclear weapons development program that you know of?

Mr. VEST. Not that I know of, sir, [deleted].

Senator SYMINGTON. Are there any other countries that you think have the weapons besides the seven that you talk about and the six members of the nuclear club?

Mr. VEST. No, sir.

STEPS UPON DISCOVERY OF DIVERSION OF MATERIAL

Senator SYMINGTON. Well, should there be a discovered diversion of material, what are the steps and the likely timespan between an IAEA suspected discovery or suspicion and the actual announcement to the world of such a violation?

Mr. VEST. If the IAEA discovered something, I can only assume they would notify the supplying country involved at once, and then the question as to how that country wanted to deal with it would be largely a matter of the country itself which had supplied the material.

Senator JAVITS. But there is no obligation to notify other members, other adherents?

Mr. VEST. Not that I am aware of. Is there?

Mr. OPLINGER. I think under those circumstances they would notify the Board of Governors of the agency.

Senator JAVITS. Of which we are a member?

Mr. OPLINGER. Yes, sir.

Senator JAVITS. Could you give us that, in text, for the record I ask unanimous consent.

Senator SYMINGTON. Without objection.

Mr. VEST. I will.

[The information referred to follows:]

IAEA STEPS IN EVENT OF DIVERSION OF MATERIAL

[Supplied by Department of State]

The statute of the International Atomic Energy Agency, Article XII, paragraph C, specifies the steps to be followed in the event of a diversion of material or other safeguards violation:

"... The inspectors shall report any non-compliance to the Director General who shall thereupon transmit the report of the Board of Governors. The Boards shall call upon the recipient State or States to remedy forthwith any non-compliance which it finds to have occurred. The Board shall report the non-compliance to all members and to the Security Council and General Assembly of the United Nations. In the event of failure of the recipient State or States to take fully corrective action within a reasonable time, the Board may take one or both of the following measures: direct curtailment or suspension of assistance being provided by the Agency or by a member, and call for the return of materials and equipment made available to the recipient member or group of members. The Agency may also, in accordance with Article XIX, suspend any non-complying members from the exercise of the privileges and rights of membership."

The time frame involved in reporting violations or non-compliance would appear to be quite short, judging from the language of the Statute. An exact prediction is difficult to make, however, because it would of course depend on the circumstances involved. Past experience provides no guide either, since there have been no cases of non-compliance with IAEA safeguards.

It should also be noted that the obligation to report runs to the membership in general, and not to the supplier state.

EFFECT OF INTERVENTION AGAINST EXPORTS TO INDIA

Senator SYMINGTON. We understand that intervenors are attempting to block a nuclear fuel export to India and to participate in any future nuclear export license hearings.

If they participate as they want to, what effect will such interventions have on potential customers coming to the United States for nuclear supplies in your opinion?

Mr. VEST. It will depend on how it comes up.

Senator SYMINGTON. Well, if it does come out the way they want, then would that hurt our supply in nuclear weapons and nuclear material?

Mr. VEST. If the relationship with India is cut off entirely, even though safeguards of every kind are build into it, I think it will certainly raise the question in some peoples' minds as to whether we are a reliable supplier.

Senator SYMINGTON. Will intervention have any long-term effect on the U.S. influence in the international market and safeguards related to it?

Mr. VEST. I do not really feel qualified to answer that, sir. I am sorry.

Senator SYMINGTON. Would you see if you can get an answer out of State on that?

Mr. VEST. Yes, sir.

[The information referred to follows:]

LONG-TERM EFFECTS OF FUTURE INTERVENTION IN NUCLEAR EXPORT LICENSE HEARING PROCESS

[Supplied by Department of State]

It is difficult to assess precisely the long-term effects of future intervention in the nuclear export license hearing process. Nevertheless, it is apparent that if the regulatory process were to involve inordinate and unpredictable delays in the fulfillment of U.S. export contracts, especially for non-sensitive items like low-enriched fuel and light-water reactors, it could have the undesirable effect of undermining confidence in the U.S. among user nations. As a result, they might tend to forego purchases from the U.S. in favor of similar purchases from other supplier nations where such uncertainty and delay are not present.

The U.S. has demonstrated its leadership in promoting nuclear exports only in a context of strict safeguards, concentrating on sales of fuel and reactors while restraining sensitive exports. Therefore, a U.S. export role which became

diminished by a loss of U.S. credibility in the marketplace could bring with it a lessening of the extent to which we can influence the actions of other suppliers and continue our bilateral efforts to ensure that stringent controls and safeguards requirements will be implemented.

Senator SYMINGTON. I would ask that you take this record and declassify it—even if you only leave a few words in it. I think this is the kind of information that ought to get out to the people.

According to five great scientists up in Boston, a nuclear war before the year 2000 is not a possibility, it is a probability.

I have been trying to find out what our policy is. I know, as a member of the joint committee primarily, and chairman of its Military Applications Subcommittee, that the Atoms for Peace plan which started in 1953 could well turn out to be the greatest single mistake that the human race ever made; because we are spreading this stuff all over the world virtually uncontrolled.

France actually has not signed the Non-Proliferation Treaty, has it?

Mr. VEST. No.

Senator SYMINGTON. Nor India, nor the People's Republic.

So, half of the countries in the nuclear club have not ratified anything.

DECLASSIFICATION OF RECORD

Now, I would like for you to declassify the record of the February 24 hearing that we had with you, Mr. Vest, on the same subject.

Would you do that, sir?

Mr. VEST. All I can say, sir, is I will do my very best to look at it. I have tried to speak very frankly to you. I have nothing whatsoever—but sometimes if I have done that, it has put me in the position where if I did declassify, it would be very embarrassing.

Senator SYMINGTON. Well, there are certain things in it that you think can be declassified, and some that you think should not.

Mr. VEST. I will certainly try to go through it to the maximum extent and pick out and try to limit those areas that I feel are delicate.

Senator JAVITS. That is what I thought you did not understand from the chairman. When he said declassify the record, he meant select.

Mr. VEST. As much as possible.

Senator SYMINGTON. Oh, sure. I think the technical wording is to sanitize it. If you would sanitize it.

Mr. VEST. Well, I have not had that much experience with declassification.

Senator SYMINGTON. I want to thank you very much, sir. I think you have been very patient.

At least you can say one thing. The people in this room are very interested in what you are doing.

Mr. VEST. Well, so am I, sir, so am I.

Senator SYMINGTON. This meeting is adjourned, subject to the call of the Chair.

[Whereupon, at 5:45 p.m., the subcommittee adjourned, subject to the call of the Chair.]

NON-PROLIFERATION ISSUES

WEDNESDAY, SEPTEMBER 22, 1976

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS, AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 11:15 a.m., in room 224, Russell Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington and Case.

Senator SYMINGTON. The hearing will come to order. Dr. Ikle, we apologize for being late. We had asked you to come down at 10:30. We ran overtime with Director Bush of the Central Intelligence Agency in a confidential subcommittee hearing. So we will proceed now. I have a short statement.

OPENING STATEMENT

The Subcommittee on Arms Control, International Organizations and Security Agreements has just finished hearing from the Director of Central Intelligence, Mr. George Bush, about the nuclear capability of the Republic of China (Taiwan).

We now continue our hearing in open session with Dr. Fred C. Ikle, Director of the Arms Control and Disarmament Agency, and Mr. Arthur W. Hummell, Jr., Assistant Secretary of State for East Asian and Pacific Affairs.

The subcommittee has been concerned by recent news reports regarding possible nuclear reprocessing activities on Taiwan which could lead to the development of nuclear weapons.

Our purpose in holding this hearing today is to obtain detailed information on the present nuclear situation in Taiwan, with particular focus on whatever arrangements may be in effect to deter Taiwan from developing nuclear weapons.

So far, nuclear weapons proliferation has not reached much of East Asia. The decision of South Korea not to purchase a reprocessing plant from France was a positive and encouraging step. The development of nuclear reprocessing facilities by Taiwan could destabilize regional relationships and lead to far-reaching political and military difficulties.

Those who have followed the hearings conducted by this subcommittee over the past year and a half are aware that we believe nuclear proliferation to be perhaps the greatest danger facing mankind today.

We are encouraged by the growing interest in this country and in other nations in this problem, but discouraged, however, at the lack of concrete progress so far.

Unless this country and others take strong preventive action in the area of nuclear proliferation, the acquisition of nuclear weapons by a growing number of countries will become a fact of life posing a catastrophic threat to civilization as we know it.

With that background, we welcome you, Dr. Ikle. I understand that you have a statement. Would you read it?

STATEMENT OF FRED C. IKLE, DIRECTOR, ARMS CONTROL AND DISARMAMENT AGENCY; ACCOMPANIED BY JAMES MALONE, GENERAL COUNSEL, ACDA; AND ROBERT W. BUCHHEIM, DEPUTY ASSISTANT DIRECTOR, ACDA/NTB

Mr. IKLE. Mr. Chairman, members of the subcommittee, it is a pleasure for me to appear before you today. I understand that these hearings are concerned with the question of whether or to what extent, the Republic of China—on Taiwan—has started to separate plutonium from spent nuclear reactor fuel by chemical reprocessing. I have been informed of the intelligence briefing that you have received on this matter, and I would like to comment now on those aspects in which the Arms Control Agency is directly involved.

NPT OBLIGATIONS OF REPUBLIC OF CHINA

The Republic of China ratified the Non-Proliferation Treaty in 1970. By becoming a party to this treaty, it assumed the obligation not to develop or otherwise obtain any nuclear explosive device and not to seek any assistance in the manufacture of nuclear explosive devices. Also, the treaty obligates the Republic of China to accept the safeguard system, as it is called, of the International Atomic Energy Agency—IAEA—on plutonium and uranium for all peaceful nuclear activities within its territory or under its control.

Senator SYMINGTON. The statement says the “so-called safeguard system.”

Dr. IKLE. The meaning I want to convey is better expressed the way I just put it. It really means quotation marks around safeguard system because it has a special technical meaning. It is often capitalized, Mr. Chairman. But the treaty does not prohibit the reprocessing of spent fuel or the accumulation of plutonium.

REPROCESSING SPENT FUEL AND ACCUMULATING PLUTONIUM

Senator CASE. I read this statement before. I hate to interrupt and I won't if you or Dr. Ikle would rather continue. One particular thing struck me right hard. Is this an interpretation that our Government has put on this agreement, or is it your own personal one?

It seems on the face that either “reprocessing spent fuel or the accumulation of plutonium is a step in obtaining a nuclear explosive device which is specifically prohibited by the treaty.

Why do you say that they are not violating the treaty when they do this?

Mr. IKLE. The language of the treaty and more importantly the safeguard agreements that have been worked out in the International Atomic Energy Agency really do not prohibit—

Senator CASE. I am talking about the Non-Proliferation Treaty which you say above, in which the parties assumed the obligation not to develop or otherwise obtain any nuclear explosive device. Are not reprocessing spent fuel and accumulating plutonium steps in obtaining nuclear explosive devices?

Mr. IKLE. The accumulation of plutonium could be a step toward developing an explosive device.

Senator CASE. Why do you state it is not a violation of the treaty? It isn't specifically in words, but is it not a step?

Mr. IKLE. If it is for peaceful purposes, it is not prohibited by the Non-Proliferation Treaty. From our point of view, this may be a drawback or shortcoming of the treaty, but as a peaceful activity, the accumulation of plutonium for fueling reactors is not prohibited by the treaty.

Senator CASE. The word "for" talks about a state of mind. If the same action is good, if you have one state of mind, how can it be bad if you have another state of mind? How does the treaty obligation depend upon the state of mind?

Mr. IKLE. The treaty obligation does not.

Senator CASE. If so, is it not a pretty firm treaty obligation? If all a person has to do is say I am accumulating all of this plutonium, purely for the purpose of running a powerplant, do we have to accept that?

Mr. IKLE. We could not make the case, I believe, that this is a violation of the Non-Proliferation Treaty. However, we do not necessarily have to accept it. In many situations, indeed we have an agreement with the country that we would have to approve any reprocessing.

SIGNIFICANCE OF NON-PROLIFERATION TREATY

Senator SYMINGTON. If that is true, then the Non-Proliferation Treaty is a joke. What mystified this committee was the fact that the State Department said they had done their best to prevent the reprocessing setup being sold by Germany to Brazil and a few days later the Chancellor of Germany said he had no protest from anybody at any time. So it is clear now the Brazilians who have a great deal of uranium, as you well know, are in a position where they can make bombs through that reprocessing.

You can talk about the expense of enriching uranium from 0.7 percent U^{235} to 90 percent for explosives. One of the directors pointed out to me that enriching uranium to "weapons grade" is not the way they would do it. What they would do is only enrich the uranium in U^{235} from 0.7 to 3 or 4 percent, make their electric energy which they need very badly, and then use the plutonium created for production of bombs, they wouldn't have to go through the long and expensive process of enrichment.

Therefore, I think the Senator from New Jersey's observation is most pertinent when he says the treaty does not prohibit the reprocessing of spent fuel or the accumulation of plutonium. It means to my mind that the treaty isn't really significant.

Do you care to comment on that?

Mr. IKLE. Several comments, Mr. Chairman. The treaty first has political significance in that it makes formal a commitment of about 100 countries not to go ahead and build an arsenal of nuclear weapons, not to build a stockpile of nuclear weapons. That is very important. It is an important assurance in many regions for countries to know their neighbors are similarly committed.

It is possible to make a distinction here between the accumulation of plutonium and the accumulation of finished weapons. Nonetheless, it is clear that the treaty has its limitations in its effectiveness for separating peaceful activities from what might be preparation for weapons arsenals. It is for that reason that we, the United States, have made additional efforts which have been intensified over the last couple of years, to widen the separation between legitimate peaceful activities and what might be an effort to gain weapons material. It is for that reason that we have gone further than the Non-Proliferation Treaty would require.

We have not exported or sold reprocessing plants and we now use our influence where we can to dissuade other countries from going ahead with their own national reprocessing facilities. The same is true for highly enriched uranium.

Senator SYMINGTON. My only comment is that there is no criticism of your efforts in this field.

Senator CASE. No; it isn't that at all.

Senator SYMINGTON. Last year a group of us went out to Vienna. We decided the whole setup there was all form and no substance from the standpoint of any strict enforcement. That being true, the emphasis that we put on forming the NPT is sort of ridiculous. In the first place you can get out in 90 days by just notifying them, and in the second place, after you join, there is no certain way to see if you are obeying the rules. There is not enough money and not enough people.

Would you proceed?

THREE ADDITIONAL INTERNATIONAL AGREEMENTS TO WHICH ROC IS PARTY

Mr. IKLE. In addition, the Republic of China is a party to three international agreements involving the United States and the IAEA. Let me briefly put these agreements in perspective here.

First, there is a bilateral agreement for nuclear cooperation between the United States and the Republic of China. Under this, U.S. suppliers may provide nuclear facilities and materials to Taiwan in accordance with certain restrictions. The agreement gives the United States the right to impose safeguards as a fallback position, but also provides that existing IAEA safeguards will be applied under normal circumstances. Reprocessing is permitted only with U.S. consent and on U.S. terms.

The second is a trilateral agreement between the United States, the Republic of China and the IAEA. It provides for IAEA safeguards to cover nuclear materials and facilities supplied under our bilateral agreement for cooperation.

Third, the Republic of China has an agreement with the IAEA which subjects to safeguards a heavy water research reactor and other

nuclear materials obtained from Canada. The agreement not only covers the Canadian imports, but any nuclear material, regardless of its source, that is produced, processed, or used in the Canadian supplied facility, with certain minor exceptions. Thus, the agreement's safeguard provision must be applied to any reprocessing of fuel from this facility, regardless of the source of the natural uranium fuel.

TAIWAN'S RELATIONSHIP TO IAEA

Now, Taiwan's relationship to the IAEA requires some clarification: In December 1971, the IAEA refused to recognize the Taiwanese delegation as the legal representatives of China to the IAEA. This action has had no de facto effect on the IAEA agreements, which both the IAEA and the Government of the Republic of China continue to observe and support. The viability of these agreements is evidenced by the continued IAEA inspections on Taiwan. In any event, as I mentioned, there are the separate safeguard provisions of our Agreement for Cooperation with the Republic of China, which would be operable if for some reason the IAEA safeguards could not be continued.

ASSURANCE OBTAINED FROM ROC

In July of this year, the IAEA carried out safeguard inspections of the United States and Canadian supplied facilities on Taiwan. We understood there was no indications of any diversion of safeguarded materials or of any reprocessing having been conducted at these facilities.

However, in 1973 the Republic of China made some overtures abroad to obtain certain reprocessing equipment and materials. The United States strongly opposed this move. Recently we have approached the Republic of China on this issue of reprocessing and after discussions between Premier Chiang and Ambassador Unger, we have just obtained the following important assurance from the Republic of China:

The Government of the Republic of China has no intention whatsoever to develop nuclear weapons, or a nuclear explosive device, or to engage in any activities related to reprocessing purposes.

The Vice Foreign Minister of the Republic of China further explained this assurance as meaning that his government "would have nothing to do with reprocessing in any shape or form."

[The following information was subsequently supplied:]

In addition, we have received the following offer from the Government of the Republic of China: "The Government of the Republic of China would welcome it if the United States Government would consider recommending two or three nuclear scientists to serve as advisers to Chinese agencies concerned in the Republic of China with emolument and other expenses to be borne by the Chinese Government and work jointly in projects of nuclear research and development in all the Republic of China nuclear facilities."

PLUTONIUM REPROCESSING: JUSTIFICATIONS AND DANGER

Many specialists assert that plutonium and unburned uranium should be separated from spent reactor fuel and reused. It is true that these fissile materials could replace some of the new uranium fuel needed, but this would be at most only about one-third of the fuel required and far less in a growing nuclear power system, such as

Taiwan is now developing. Thus, a country with only a few reactors does not have convincing economic justification for building its own reprocessing plant. In all likelihood, it would cost such a country more to extract the energy value from the spent fuel than it would have to pay for the equivalent amount of fresh fuel. Nor would such a country significantly decrease its dependence from fuel imports. And the problem of storing the spent fuel can be handled more simply and cheaply without going through the trouble and cost of a reprocessing plant and fuel recycling.

Thus, the peaceful justifications for reprocessing are dubious at best. More importantly, widespread plutonium reprocessing would create a serious danger. By operating a reprocessing plant over some time, a country could accumulate large amounts of weapons-usable materials in ready form.

Senator CASE. It is my understanding that while your statement is quite true in respect to the present power plant, that if they went into an expansion, say, from 1 to 10 or 15, they would need more fuel than they can get from—

Mr. IKLE. No; the question is at what time does reprocessing of the burnt reactor fuel become economically viable? In this country we have some 55 power reactors. The Republic of China has now four under construction. We have 55 in operation and we do not yet reprocess the spent fuel.

Senator CASE. We are all worried about the fuel supply, aren't we?

Mr. IKLE. But you still need fresh fuel supply. Even if you do reprocess up to two-thirds of the fuel would have to be fresh, that is to say, either natural uranium for a Canadian-type reactor or enriched uranium that we, for example, furnish to Taiwan and other countries.

Senator CASE. Reprocessing is supposed to make it possible to use a given amount of natural uranium many times over?

Mr. IKLE. Not really. As calculated, it saves you maybe up to the maximum of 30 percent of the fuel. And it may not save you money because it may cost more to reprocess than it would cost to buy fresh supplies. It may not make economic sense, but it is only in the future breeder reactor where we may see a more continued reuse and regeneration of fuel.

NEW BREEDER REACTOR

Senator CASE. Could you expand that a little bit more because it is a fairly important point. What is the new breeder reactor and how does it differ from what we have now?

Mr. IKLE. The breeder reactor would generate plutonium more copiously than the light water reactor and would utilize plutonium fuel. In some sense, it would produce more fuel than it consumes. It would be generating fresh fuel. Dr. Buchheim could give you a more technical explanation of the process.

Senator CASE. Isn't the thought generally that the breeder reactor is what we are coming to if we are going to expand nuclear power generation?

Mr. IKLE. The breeder certainly is an important project for the future. We do not have a commercially viable breeder reactor. We are not yet sure about the cost and there are alternative ideas being worked

on for future nuclear power. But the breeder reactor clearly is a very important potential project.

Senator CASE. And the breeder reactor is the one that involves producing enormous amounts of plutonium?

Mr. IKLE. It would do that, Senator Case. We project that the breeder reactor may become commercially viable in the 1990's so that is quite some time in the future, and there are a number of alternative technologies, some which may be creating more of a hazard and some may be less hazardous from the point of view of proliferation. We still have some time for additional research and development here.

Senator CASE. At the present time, reprocessing would add only 30 percent of the usefulness of the uranium we now have for the purpose of power generation?

Mr. IKLE. That is correct.

Senator CASE. What would be the factor in the case of the breeder reactor?

Mr. IKLE. I am not sure, unless Dr. Buchheim would be able to give you an answer here, this has not been fully worked out yet.

Senator CASE. I wouldn't hold you to an error of 100 percent. What is the nature?

Mr. IKLE. It might double the utilization of the fuel.

Senator CASE. One hundred percent instead of thirty?

Mr. IKLE. Well, more than that. With the reprocessing now for the reactors that we have in this country, you might at the maximum save one-third of the enriched uranium fuel. You don't save that in terms of dollars, you save it in terms of amounts of fuel because it costs more to reprocess.

Senator CASE. What about this breeder reactor?

Mr. IKLE. It is really quite uncertain, but we can check this further and maybe submit some estimates for the record. There are a number of estimates regarding the extent to which a breeder reactor would generate plutonium and would utilize the fuel.

[The information referred to follows:]

EXTENT TO WHICH BREEDER REACTOR WOULD GENERATE AND UTILIZE PLUTONIUM

(Supplied by ACDA)

Hypothetically, a factor of twenty to thirty may be possible, but the development of the breeder reactor is currently in an experimental stage which will not be completed until after 1986 when the breeder program will be evaluated and a more concrete figure may become available. It should be understood, however, that the breeder reactor may never be brought into commercial use because of the acute safety hazards and the heavy capital and operating expenses associated with it.

Senator CASE. The range of estimates is from what to what?

Mr. IKLE. Well, whether it would double the value of the fuel or—

Senator CASE. I mean the amount.

Mr. IKLE. The amount; yes. But the important question, Senator Case, is the cost of building and running the breeder. The economics dominate the story.

Senator CASE. What we are thinking about is the mass of nuclear material?

Mr. IKLE. There is no question that the breeder reactor as now conceived could produce a lot of plutonium, consume plutonium, and thus

generate further and from the proliferation point of views have surplus plutonium. That is very clear.

Senator SYMINGTON. Proceed.

DANGER CREATED BY WIDESPREAD PLUTONIUM PROCESSING

Mr. IKLE. Widespread plutonium reprocessing would create a serious danger. By operating a reprocessing plant over some time, a country could accumulate large amounts of weapons-usable material in ready form. One reactor of the type now commonly sold yields enough plutonium per year, given reprocessing, for some 10 to 70 bombs. With a ready stock of plutonium on hand, a nation could drastically shrink the time required to manufacture nuclear explosives to weeks or even days if all the other elements required were in place. This could make it very difficult for the international safeguard system to provide timely warning.

It is these considerations which have led the United States to oppose the sale of reprocessing plants abroad and to discourage the spread of national reprocessing facilities. We, therefore, welcome the recently announced decision by the Government of the Republic of China not to acquire their own reprocessing facilities. This is a very helpful step and is the example that we would like to see followed by other nations.

This concludes my remarks, Mr. Chairman. I will be happy to answer any questions which the subcommittee may have on this topic.

LETTER FROM ROC AMBASSADOR JAMES SHEN

Senator SYMINGTON. Thank you, Dr. Ikle. First, I would ask unanimous consent, without objection, to place in the record a letter I received this morning from the Embassy of the Republic of China on this matter signed by Ambassador Shen. His remarks are comparable, if not similar, to those that you have given us this morning emphasizing that their interest is not in producing nuclear weapons.

[The information referred to follows:]

EMBASSY OF THE REPUBLIC OF CHINA,
Washington, D.C., September 21, 1976.

Hon. STUART SYMINGTON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR SYMINGTON: Since the Washington Post story of August 29, 1976, alleging that the Republic of China on Taiwan has been surreptitiously reprocessing spent nuclear fuel with a view to developing an atomic bomb or device, my government has felt it necessary to clarify the situation by forthright and unequivocal statements setting forth the truth. Unfortunately, our denials have received little or no attention in the media in this country.

In view of the seriousness of this allegation and the possible harm it could do to the relations of mutual trust and friendliness existing between our two countries, my government reaffirmed its assurances to the Government of the United States through diplomatic channels on September 17 that "it has no intention whatsoever to develop nuclear weapons or a nuclear explosive device, or to engage in any activities related to reprocessing purposes."

In the same communication, my government also expressed the hope that the Government of the United States would consider recommending two to three American nuclear scientists to serve as advisers to Chinese agencies concerned in

the Republic of China and work jointly in projects of nuclear research and developments in all our nuclear facilities, with all expenses to be borne by my government.

I wish to point out that my government was among the first nations to sign and ratify the Treaty of Non-Proliferation of Nuclear Weapons and that our Premier, Chiang Ching-kuo, has on several occasions declared our decision not to manufacture any nuclear weapons. Herewith I enclose a statement issued by the Government Information Office on September 16.

Another fact I wish to mention is that our nuclear installations on Taiwan are subject to periodic safeguards inspections by experts of the International Atomic Energy Agency. The last such inspection took place in July and my government has suggested to the IAEA to publish its latest findings as soon as possible so as to help clarify the situation.

On the eve of the hearings called by the Senate Committee on Foreign Relations—Subcommittee on Arms Control, International Organization and Security Agreements—I take the liberty of writing you in the belief that you will find the information contained in this letter both timely and pertinent.

With warmest personal regards,

Sincerely,

JAMES C. H. SIEN,

Ambassador of the Republic of China.

Enclosure.

STATEMENT BY THE CHINESE GOVERNMENT INFORMATION OFFICE, TAIPEI,
TAIWAN, REPUBLIC OF CHINA, SEPTEMBER 16, 1976

Premier Chiang Ching-kuo emphatically stated at a Cabinet meeting held Thursday, September 16, that the Republic of China has never had the intention to manufacture nuclear weapons, nor has there been any fact to indicate that it has. The Cabinet solemnly stated the following:

1. Since 1955, the competent agencies of the Republic of China have fully cooperated with officials both of the International Atomic Energy Agency (IAEA) and of the United States Government in the application of safeguards inspections concerning its research and development of nuclear energy for peaceful uses. The IAEA has consistently found in its regular inspections that the nuclear equipment and material used by the Republic of China are entirely in conformity with the standards of international inspection.

2. The Republic of China is a signatory of the Treaty of Non-Proliferation of Nuclear Weapons and has always strictly observed all its provisions.

3. The Government of the Republic of China has no intention whatsoever to use its human and natural resources for the development of nuclear weapons or to obtain equipment for reprocessing spent nuclear fuel.

4. The Government of the Republic of China will continue to accept IAEA inspections and to make public its nuclear energy research projects. It welcomes nuclear scientists of friendly countries to come to this country to work jointly with its own scientists in research and development for peaceful uses of nuclear energy.

EFFORT TO CONTROL PROLIFERATION

Senator SYMINGTON. The way things have been going, if I were a small country and felt there was any danger from a larger country or any other country, I would do all I could to obtain nuclear weapons in defense of my country, and I have not been surprised—but I have been distressed—by the press reports in regard to Taiwan.

These hearings, as you know, emanated from press reports about the matter. I remember one time years ago when I asked a rather delightful mechanic who I knew, "How are things going today?" It was very hot, it was summer, before air conditioning. He said, "Well, the faster I go, the behinder I get."

It seems to me the more effort we put on controlling proliferation, the more proliferation is happening all over the world.

CONSISTENCY OF TAIWAN'S NUCLEAR ACTIVITIES WITH PEACEFUL PROGRAM

Now I have some questions I would like to ask, sir. To the best of your knowledge, are all of Taiwan's nuclear activities consistent with the completely peaceful program?

Mr. IKLE. Mr. Chairman, we have no evidence to indicate that there has been reprocessing in violation of these agreements.

ECONOMIC JUSTIFICATION FOR REPROCESSING PROGRAM IN TAIWAN

Senator SYMINGTON. Do you believe there is economic justification for a reprocessing program in Taiwan?

Mr. IKLE. As I stated, Mr. Chairman, the nuclear power program in Taiwan is not large enough to warrant the expense of plutonium reprocessing.

U.S. ACCESS TO IAEA INSPECTORS' REPORTS

Senator SYMINGTON. Does the U.S. agreement for nuclear cooperation with Taiwan give the United States access to the reports of the inspectors from IAEA who check Taiwan's nuclear facilities?

Mr. IKLE. We do not have automatic access, Mr. Chairman, but with the consent of the country concerned, we can obtain access.

IAEA INSPECTION OF TAIWAN'S FACILITIES

Senator SYMINGTON. Does the IAEA inspect all of Taiwan's nuclear facilities?

Mr. IKLE. IAEA is authorized and indeed has the obligation.

Senator SYMINGTON. I didn't ask about its authorization, I asked if it does inspect all of Taiwan's nuclear facilities.

Mr. IKLE. IAEA will inspect all declared nuclear facilities.

Senator SYMINGTON. I guess we had better leave it right now.

U.S. TRAINING OF TAIWANESE STUDENTS

Do you know roughly how many students from Taiwan have been trained in the United States in nuclear physics and nuclear engineering.

Mr. IKLE. I would have to supply that for the record, Mr. Chairman.

Senator SYMINGTON. Would you do that?

[The information referred to follows:]

TRAINING OF ROC STUDENTS IN NUCLEAR TECHNOLOGY

(Supplied by ACDA)

ERDA has provided us with information showing that during the period 1970-75, there were 354 ROC nationals who received training at AEC/ERDA facilities in nuclear technology. We know of no governmental source which could provide any specific information regarding ROC students who have been trained in nuclear physics or nuclear engineering at US colleges and universities.

SECURITY IMPLICATIONS OF TAIWAN'S DEVELOPING NUCLEAR WEAPONS

Senator SYMINGTON. What implications do you believe the development of nuclear weapons by Taiwan would have for U.S. security interests?

Mr. IKLE. I think it would create serious damage for U.S. security interests not only in a particular area and because of our treaty commitments to the Republic of China, but also as a precedent in the worldwide spread of nuclear proliferation and the repercussions it would create among other countries in the region.

U.S. RESTRICTIONS ON NUCLEAR COOPERATION WITH TAIWAN

Senator SYMINGTON. What specific restrictions does the United States apply to nuclear cooperation with Taiwan?

Mr. IKLE. We have the restrictions under our agreement for cooperation and in addition, of course, we have made it very clear that beyond that we do not wish reprocessing to take place in the Republic of China.

Senator SYMINGTON. What have we told Taiwan regarding the reprocessing of spent fuel of United States origin?

Mr. IKLE. That we not only would not consent to the reprocessing of fuel of U.S. origin, but we have made it clear that we would not want any reprocessing to take place.

Senator SYMINGTON. We would not want?

Mr. IKLE. Right, we would not authorize the reprocessing of U.S. spent fuel, and given our close relationship, we have also made it clear, as I stated before, that there should be no reprocessing.

Senator SYMINGTON. Did we say what we would do if they did not agree with our warning?

Mr. IKLE. I don't think we spelled things out in this way. I think it is clearly implied from our relationship, our continuing relationship.

Senator SYMINGTON. You see the thrust of my question? There are a lot of resolutions in the Senate and no doubt in the House also. They don't mean anything. We finally got an amendment to the Foreign Assistance Act through, although the administration opposed it. I noticed the Secretary utilized this in discussions with Pakistan.

We have asked them not to do it, but have we said anything about what we do if they did do it?

Mr. IKLE. No, Mr. Chairman. Of course, the implications of your amendment are clear and they have been clearly explained. This is the law and they would take effect.

TAIWAN'S REPROCESSING LABORATORY AND OTHER REPROCESSING CAPABILITY

Senator SYMINGTON. When do you expect Taiwan's small reprocessing laboratory to become operational?

Mr. IKLE. We expect it not to become operational now that we have the assurance from the Government of China that they do not want to engage in reprocessing.

Senator SYMINGTON. Is the United States cooperating in any way on this project?

Mr. IKLE. We are not giving any assistance on the reprocessing.

Senator CASE. What are they going to do with the small facility which is under construction?

Mr. IKLE. I couldn't give a prediction whether it will be usable for some chemical or other activity.

Senator SYMINGTON. Beyond the small reprocessing laboratory being built, does Taiwan have any other reprocessing capability?

Mr. IKLE. Taiwan has the know-how in the nuclear area that could be utilized. They have not built a reprocessing plant.

OPERATING CAPACITY AND USE OF FUEL FABRICATION PLANT

Senator SYMINGTON. What is the capacity of the fuel fabrication plant?

Mr. IKLE. I would have to submit that for the record.

Senator SYMINGTON. Will you do that, and also tell us at the same time if it is being used, in your opinion, for fabrication beyond any legitimate requirements.

Mr. IKLE. I will submit this for the record.

[The information referred to follows:]

OPERATING CAPACITY AND USE OF FUEL FABRICATION PLANT

(Supplied by ACDA)

This plant, which is located at the GROC Institute for Nuclear Energy Research (INER) at Huaitzupu on Taiwan, has a capacity to produce 25 to 30 tons of fabricated fuel per year, on a one work-shift basis.

The INER fabrication plant is subject to IAEA safeguards and to the best of my knowledge is not being utilized in any manner inconsistent with the Non-Proliferation Treaty or any of the IAEA agreements.

U.S. PROVISION OF FUEL FOR TAIWAN'S RESEARCH REACTOR

Senator SYMINGTON. Is the United States providing fuel for Taiwan's research reactor?

Mr. IKLE. I would have to check when we last provided fuel. In the past we have provided fuel for the research reactor.

Senator SYMINGTON. Is that fuel enriched in U-235 to weapons quality? What is the enrichment?

Mr. IKLE. I would have to check what type of fuel it is and the degree of enrichment and provide this for the record.

[The information follows:]

U.S. PROVISION OF ENRICHED FUEL FOR ROC REACTORS

(Supplied by ACDA)

The U.S. does not provide fuel for the research reactor at INER but does supply fuel for other research reactors situated in the ROC.

According to ERDA the most recent U.S. supplied shipment of fuel for a ROC research reactor occurred in December 1974.

According to information we have received from ERDA, the U.S. supplied uranium fuel is enriched in the isotope U-235. The most recent shipment contained an enrichment of less than 2%.

Senator SYMINGTON. Would it have application to the weapons programs?

Mr. IKLE. Only if its level of uranium enrichment were high enough and the amounts were large enough. I believe there is not highly enriched uranium research reactor there. The plutonium will have to be separated in amounts large enough to have application for a weapons program.

LIMITED NUCLEAR WAR IN EUROPE

Senator SYMINGTON. Dr. Ikke, I would like to turn to another subject as long as we have you here. Somebody has sent me a galley proof of a book by Alva Myrdal which Mrs. Myrdal is, I think it is fair to say, an expert in this field. I don't necessarily agree with some of her conclusions, let me emphasize that, but I am very much impressed by some of the things she says.

Many years ago we had a discussion about a limited nuclear war, especially in Europe. Secretary McNamara testified there were 7,000 nuclear warheads in Europe. When I first came into the Senate, about a quarter of a century ago, I tried to get the Armed Services Committee on this subject, but was told it was too highly secret for anyone, even the Armed Services Committee to get into.

I was just reading this book last night. Mrs. Myrdal has various figures and statements that have to do with this problem. She quotes an esteemed Frenchman in a 1969 study. In the study he says that the weapons already available are sufficient to annihilate the total world population 690 times over. Then Mrs. Myrdal goes on into the question of nuclear weapons and states that the Soviet policy in effect does not countenance limited nuclear war, nor do I, incidentally, and I never did believe that you could hold it to a limited nuclear war.

This is an extraordinarily interesting book. She gives first the Soviet point of view on a limited war over Europe and the American point of view and the European point of view and quotes quite a few German opinions about it, including the present Chancellor. Have you seen this book?

Mr. IKKE. I have not yet.

Senator SYMINGTON. I think it will be of interest to everybody in the world, not just in the United States—not necessarily the conclusions but the facts.

Chancellor Schmidt is quoted as saying:

We have thus sketched out NATO's dilemma regarding deterrence. Effective defense of Europe would only be possible for a short time or in a geographically limited area, and it would lead rapidly to the destruction of Europe.

He is quoted as saying further:

A war which they regard as limited war by the superpowers would be no less a war of annihilation for countries of the battlefield.

This is the type and character of information that I have learned over many years should be developed by some committee on the Congress. The people in the world have a right to know some of these things.

Mrs. Myrdal quotes a retired German general stating:

Tactical nuclear defense of Western Europe would lead to its destruction.

We know we have 7,000 nuclear weapons in Europe, and she quotes Dr. Herbert York as stating 166 one-megaton ground burst explosions within a wide area of lethal fallout could cover all of West Germany, killing all persons in the open.

This again is pretty serious stuff. The impression she gives is that many Germans are gravely apprehensive about this matter and that the German Government itself is apprehensive about this matter.

In one sentence I noted, she said the present distinction between nuclear and conventional weapons becomes blurred. It will be impossible even for those who believe in limited war to avoid uncon-

trollable escalation. That is my conviction after 25 years here and a good many years in the Pentagon before I came here.

DEVELOPMENT OF MINI-NUKES

Nevertheless, I understand that we are now developing what we call mini-nukes, tiny little nuclear weapons, which are considerably more damaging than conventional weapons.

I have quoted often a superb pamphlet you put out listing the yield of the Hiroshima bomb as 13,000 tons. The largest device ever tested was 58 megatons. I was in London and Birmingham and I saw what the bombs did there. Yet one-quarter ton bombs were dropped in the worst raids on those two cities.

Do you know why we are developing these mini-nukes? Can we only be developing them for a limited war, and do you know why we are doing that?

Mr. IKLE. Mr. Chairman, we have a policy not to develop these "mini-nukes" that would blur the dividing line between conventional and nuclear weapons. In fact, I think in 1974, let me take credit for that, we came out with a formal statement in Geneva giving this assurance to other countries that we had no intention of developing such mini-nukes that would destroy—

Senator SYMINGTON. Let's get a specific break point. What is the lowest yield in any nuclear weapon that we are attempting to develop today?

Mr. IKLE. I would have to supply that for the record. It is classified information.

[The information referred to follows:]

DEVELOPMENT OF LOW YIELD NUCLEAR WEAPONS

(Supplied by ACDA)

We have developed nuclear weapons which have yields of less than one kiloton which include the Lance (a surface-to-surface missile), and certain 8" and 155mm artillery, tactical bombs and atomic demolition munitions. The specific sub-kiloton yield of any weapon is classified, and in our contacts with DOD representatives to obtain this information, we have been unsuccessful in obtaining it in unclassified form.

Senator SYMINGTON. I take issue with you because I happen to know how low the yield would be in nuclear weapons we are trying to produce. I say that if you do produce them that low, then you have blurred the difference between a conventional and a nuclear war. I am very grateful that my colleague, the ranking member of the full Foreign Relations Committee, Senator Case, is interested in this today because we are getting into the guts of the future of the world.

I believe we have now gone to an effort which in effect does blur the difference between conventional and nuclear weapons. If it is true that the Soviet Union policy is that they are not preparing for a limited nuclear war, if it is true that there is grave apprehension in Germany about a limited nuclear war, if it is true that we have 7,000 warheads in Germany and are trying to make them smaller and smaller in order to have a limited nuclear war, then we have a problem of policy, not only with our allies but with our own people in this country as to what we are doing.

Don't you agree with that?

Mr. IKLE. Mr. Chairman, I agree with the importance of preserving the dividing line between nuclear weapons and conventional ones. Of course, efforts have been made to lower the destructiveness of nuclear weapons that are planned to be used for tactical purposes but—

TACTICAL PURPOSES

Senator SYMINGTON. What do you mean by tactical purposes? What do you mean by that?

Mr. IKLE. Your question is a valid one and I often stress myself that the distinction between tactical and strategic isn't all that solid.

Senator SYMINGTON. What you really mean is that you would only kill a few million people instead of 100 million?

Mr. IKLE. What people envisage for such nuclear weapons is that they would destroy tanks or a bridge rather than inflicting great destruction in a wider area. Now, an effort was underway, or interest was expressed, in going further still and building nuclear weapons whose effect would be such that you couldn't for sure make a distinction. You wouldn't be able to tell for sure whether it was a nuclear weapon without specific measurement. That effort was stopped because of the arms control consideration and because of the desire not to do away with the fire break but rather to strengthen it.

TONNAGE OF SMALLEST ATTEMPTED U.S. NUCLEAR WEAPON

Senator SYMINGTON. I say with great respect that in order to justify your statement that the effort is being made not to blur the distinction between conventional weapons and nuclear weapons, you should tell us what is the smallest nuclear weapon you are attempting to produce at this time.

Mr. IKLE. I agree that this question is precisely to the point and I would like to submit the answer probably in confidential form for the record.

[As of the date of publication, the information referred to had not been supplied.]

[The following information was subsequently supplied.]

LARGEST NUCLEAR EXPLOSION

(Supplied by ACDA)

I would like to add to your comment regarding the largest nuclear explosion. In this regard ACDA published unclassified information pertaining to a Soviet nuclear test in 1962 which produced a yield of 58 million tons and was then and now remains as the world's largest nuclear detonation. This information is set forth on page 8 of the ACDA publication entitled, "Worldwide Effects of Nuclear War . . . Some Perspectives".

Senator SYMINGTON. Why do we classify that? We now know that any strong man can carry a Hiroshima bomb into this room in a suitcase. That has been publicized many times. We are getting way, way down. As pointed out by Dr. Taylor, you don't have to be a country to get into this business, you can be an intense private organization that feels strongly, like the Irish Republican Army or Palestine Liberation Front or a criminal organization.

If you are going to get these down to where they are really very little more than a conventional weapon, I say you have a problem. So why can't you state what size you are going to make them?

Mr. IKLE. Well, I agree with you. There are two problems: one, that weapons could be easily made which wouldn't weigh that much so they could be smuggled, or what have you—the risk with which we have long been concerned.

Second, that you might make a particular effort to reduce to such an extent that you could no longer distinguish without special measurements, between a nuclear and conventional explosion. It is the latter particular effort we have turned off. It is not to say the yield of weapons has not been lowered, as you correctly pointed out.

Senator SYMINGTON. I am going to turn this over to my colleague, Senator Case, but I wish some of these people who talk about clean nuclear weapons that will only kill a few hundred thousand people, and so forth, would read what Mrs. Myrdal, the former Swedish Ambassador to India says. She is very well informed on this subject because of her work at the U.N. I wish they would read what she says about the reaction in Europe to our determination to maintain nuclear weapons against the opposition of many people in Germany, because we put up the money for NATO and they feel NATO is important. It is a rather interesting problem. I won't pursue it further, but I wish you would see if you could get declassified the smallest bomb we have made because you have declassified the size of the Hiroshima bomb and also the largest bomb ever tested. So it would be in pattern if you would give us that information. Will you see if you can get that done?

Mr. IKLE. We will try.

[The following information was subsequently supplied.]

ACDA PUBLICATION OF NUCLEAR EXPLOSION YIELD

(Supplied by ACDA)

We did not declassify what you refer to as "the larger bomb that we have made", but rather, as mentioned, we published unclassified information regarding the yield of a Soviet nuclear explosion which took place in 1962.

Senator SYMINGTON. Thank you.

ACCOMMODATION OF SPENT FUEL RODS

Senator CASE. Thank you, Mr. Chairman. Dr. Ikle, now that Taiwan has been given reprocessing, what is it going to do with the spent fuel rods from the Canadian reactor and spent fuel rods of U.S. origin?

Mr. IKLE. Spent fuel rods, of course, are being stored in this country and they can be stored in Taiwan over a long period of time. You may want to either move to a new storage facility or to send the spent fuel rods for reprocessing or further storage to another country, for example, the United States. I think this decision is not pressing at all and the people in charge of the atomic energy program in Taiwan will, I am sure, easily find a commercially viable solution. This is in many years.

There are no power reactors in operation now so this question applies only many years down the road.

Senator CASE. Many years down the road?

Mr. IKLE. Yes. This first power reactor construction has been started now. The first one will be in operation in 1977. Then after that it will take a number of years for the fuel rods to accumulate. The initial

accumulation is normally accommodated in a cooling pond right next to the reactor. That is what we do in this country.

SPECIFICITY OF U.S. NUCLEAR ARRANGEMENTS WITH TAIWAN

Senator CASE. This relates to another question with which you have dealt in part, that is, our nuclear arrangements with Taiwan. You don't regard this particular matter as something that ought to be worked out and made more specific than it is now?

Mr. IKLE. Not at this time, Senator. Now, we are doing research in this country and working here on the worldwide problem of what to do with the spent fuel and what to do about storage and waste storage.

REGIONAL REPROCESSING ARRANGEMENTS IN EASTERN ASIA

Senator CASE. I would like you to consider what or tell us what, if anything, has been done in the way of getting up regional reprocessing arrangements in eastern Asia, cooperative arrangements among the nations there. Have any concrete proposals along that line been explored?

Mr. IKLE. No concrete proposals, Senator. We have made studies about regional nuclear fuel centers which would not necessarily involve reprocessing. In the first instance they may be concerned with fuel fabrication, joint efforts for storage, waste management, and transportation centers. If you do go to a regional reprocessing center then, of course, you have to think about what you do with the separated plutonium. Widespread distribution of the separated plutonium from the regional center would be self-defeating, because then you would be sending back the material that is dangerous. That problem has to be worked out and thought through.

Senator CASE. Is this a matter in which anything is actively being considered between this country and the countries of east Asia?

Mr. IKLE. I would say actively considered is putting it too strongly. It is being discussed in IAEA. Studies are underway in Vienna on regional nuclear fuel centers, including reprocessing. Economic evaluations are being made and we are doing studies here in this country and have had informal discussions with a number of countries.

Senator CASE. That applies to the problem generally and not just east Asia, I take it?

Mr. IKLE. That is right, Senator.

DE JURE EFFECT OF IAEA OUSTER OF TAIWAN DELEGATION

Senator CASE. You said in your statement that the ouster of the Taiwanese delegation by the International Atomic Energy Agency had no de facto effect on the safeguards of the agency. What is the de jure effect?

Mr. IKLE. Well, the de jure effect is that the Government of the Republic of China is not now represented in the IAEA.

Senator CASE. It is not?

Mr. IKLE. It cannot exercise the membership it used to have.

Senator CASE. Did the People's Republic take this over and assume the obligation as well as the privileges of membership? Is it an active member now?

Mr. IKLE. The People's Republic of China has not taken up membership in IAEA.

Senator CASE. The membership is not being either exercised by either country?

Mr. IKLE. That is right.

Senator CASE. And the obligations are not legally effectively binding upon either one of them?

Mr. IKLE. That is why it is important that we have this agreement with the Republic of China. We have the bilateral agreement—

Senator CASE. I am talking about the International Atomic Energy Agency.

Mr. IKLE. The Non-Proliferation Treaty is an independently viable treaty.

Senator CASE. Has the People's Republic evidenced an interest in joining this agency?

Mr. IKLE. Not in any active way at this time.

Senator CASE. The only thing that has happened legally is that the Republic of China has been thrown out?

Mr. IKLE. That is right.

Senator CASE. Senator Symington is coming back. I don't think he had any further questions of you, Dr. Ikle. If you don't mind waiting for a moment until he returns, I think we will suspend the hearing for about 5 minutes because he will be back in less time than that. I have to go over and vote myself.

Mr. IKLE. Right.

[Brief recess was taken.]

Senator SYMINGTON. Dr. Ikle, we are very grateful to you, sir. I am sorry we had this interruption. We both covered the vote to save you time. Thank you very much for your tolerance of the problem here. We would ask as soon as is convenient you give us answers to the questions. We hope as much as possible will be declassified for reasons I have tried to make clear. It is a little bit like Mark Twain and the weather.

COMMENDATION OF DR. IKLE AND SENATOR SYMINGTON

May I say from a personal standpoint that I think you have been doing a fine job in one of the most important positions in the world.

Mr. IKLE. Thank you, Mr. Chairman. I think we have to see these things a bit in perspective. Over time, science and technology will become more diffused. It doesn't mean that we cannot make a strong effort of separating peaceful uses from weapons use and I think you Mr. Chairman, have been far ahead here.

I have noted you mentioned the importance of this about ten years ago to Defense Secretary McNamara and again to my predecessor. I think to some extent people are now catching up with you.

Senator SYMINGTON. You are very kind. I appreciate your coming and also the gentlemen with you. Thank you very much, Doctor.

Mr. IKLE. Thank you, Mr. Chairman.

Senator SYMINGTON. I think we have another witness still. I am sorry we have been delayed. Secretary Hummel, you take the center seat. Mr. Secretary, do you have a statement?

Mr. HUMMEL. Yes, I do.

Senator SYMINGTON. Sorry we are going overtime. Will you read it?

STATEMENT OF ARTHUR W. HUMMEL, JR., ASSISTANT SECRETARY, BUREAU OF EAST ASIAN AND PACIFIC AFFAIRS, DEPARTMENT OF STATE; ACCOMPANIED BY DEAN H. COOPER, DEPUTY DIRECTOR, OES/NET/IM, DEPARTMENT OF STATE; ALLEN W. LOCKE, INTELLIGENCE RESEARCH SPECIALIST, OFFICE OF STRATEGIC AFFAIRS, BUREAU OF INTELLIGENCE AND RESEARCH, DEPARTMENT OF STATE; AND BURTON LEVIN, COUNTRY DIRECTOR, REPUBLIC OF CHINA, DEPARTMENT OF STATE

Mr. HUMMEL. Mr. Chairman, it is my honor to appear before this distinguished committee and to testify concerning our policies in the nuclear field with respect to Taiwan.

The administration is deeply committed to preventing the further proliferation of nuclear weapons. In recent years, great effort has been devoted to restricting the spread of national uranium enrichment and spent fuel reprocessing facilities. I believe we have made significant progress in these areas; we are determined to do more.

U.S. NUCLEAR POLICIES WITH RESPECT TO REPUBLIC OF CHINA

Our nuclear policies with respect to the Republic of China combine cooperation in the peaceful uses of nuclear energy with determined vigilance against the possibility of potential nuclear proliferation. The main elements of our policy are:

To cooperate with the ROC's plans to meet a growing portion of its electric power needs from nuclear reactors.

To cooperate in those areas of peaceful nuclear research and training for which the ROC has a legitimate need.

To insure that the ROC abides by its policy not to develop nuclear weapons.

To insure that the ROC does not obtain a national reprocessing or enrichment capability.

In many respects, the issues we confront and the policies we are pursuing in the nuclear field with the ROC are similar to those we face in other areas of the world. However, our nuclear relations with Taiwan are unique in other respects.

First, we are, in a practical sense, Taiwan's only source of reactors and enriched uranium fuel for its nuclear power program.

Senator SYMINGTON. What do you mean by "in a practical sense?"

Mr. HUMMEL. The technology now comes from us and the four nuclear power reactors all come from us. The ROC's previous relationship with Canada has been terminated.

Senator SYMINGTON. But there is no reason they couldn't go to Germany or France, is there, the same nation, very possibly other countries, and get the same equipment?

Mr. HUMMEL. That is correct, sir, they could.

Senator SYMINGTON. Thank you. Will you proceed?

Mr. HUMMEL. This reduces the problems of coordination with other suppliers and increases Taiwan's dependence on a cooperative U.S. attitude in order to maintain its nuclear power program.

Second, our nuclear policies in the ROC must be determined within the context of our overall China policy. They must be compatible with

our commitment to normalize our relations with the People's Republic of China and with our interest in encouraging a peaceful solution of the Taiwan problem. For these reasons, our nuclear policies with respect to Taiwan are formulated with great care and circumspection.

ROC'S NUCLEAR POWER AND RESEARCH PROGRAMS

Since the late 1960's, the Republic of China has been planning to meet an increasing portion of its energy requirements from nuclear power. The ROC has industrialized rapidly over the past decade and expects this trend to continue. Its energy needs have grown proportionately. Domestic energy sources, largely hydroelectric, meet only a fraction of Taiwan's needs. As the ROC's efforts to develop offshore oil have yet to bear fruit, the ROC expects to remain totally dependent for the foreseeable future on imports for its growing fossil fuel needs. Consequently, the ROC is convinced that diversification into nuclear power is essential to its continued economic growth; the energy crisis in 1973 reinforced their belief in the correctness of this decision.

There are presently four nuclear generating units under construction on Taiwan; two others are in the planning stage. The first nuclear generating unit is scheduled to begin operation next year. These four generating units will provide approximately a third of total projected electric generating capacity when they become operational. When all six are completed in the mid-1980's, nuclear power will provide 45 percent of the island's electric generating capacity.

The ROC is aware that this program is crucial to its continued economic vitality. Moreover, it will be investing several billion dollars in this program, a sizable stake in terms of Taiwan's economy. The nuclear powerplants and the low enriched uranium to fuel them are all being supplied by American companies.

In addition to its nuclear power program, the ROC has been conducting a modest program in nuclear research since the late 1950's. This program began at Tsinghua University which has a small research reactor supplied by the United States. In the mid-1960's, the Government intensified its research program and established a Government agency, the Institute for Nuclear Energy Research (INER), for this purpose. INER has developed plans for research into all aspects of the nuclear fuel cycle. INER has an operational fuel fabrication plant and a Canadian-supplied 40-megawatt research reactor; the Institute has been constructing a small reprocessing laboratory since 1969, but this laboratory is not yet operational.

U.S. INVOLVEMENT IN ROC NUCLEAR POWER AND RESEARCH PROGRAMS

U.S. involvement in Taiwan's nuclear power and research programs is governed by the terms of the United States-ROC agreement for cooperation in the civil uses of atomic energy. This agreement restricts our nuclear cooperation to peaceful purposes, provides for the application of IAEA safeguards and gives the United States a veto over the reprocessing of U.S.-supplied fuel. All U.S.-supplied facilities and materials are under IAEA safeguards and have been periodically inspected by the IAEA, most recently in July of this year.

Senator SYMINGTON. If I may interject there, I have said many times and continue to say the IAEA enforcement situation is one

largely of form as against substance. I say this after an extended investigation and after talking to some of the former U.S. representatives and our people over there.

Now, you say here that this agreement restricts our nuclear cooperation for peaceful purposes. Is there any penalty of any kind from the standpoint of withdrawing any other assistance or doing something else if we find that Taiwan has not fulfilled its obligations in maintaining all of this development which we are training them in solely for peaceful purposes?

Mr. HUMMEL. It is my understanding that such sanctions are not mentioned in this international agreement and it would be unusual if they were, but the possible sanctions are, I think, well known to all parties.

Senator SYMINGTON. I think that is a fair statement. Will you proceed?

Mr. HUMMEL. Over the years, the administration has restricted U.S. cooperation to those areas where we believe that Taiwan has legitimate research and training requirements and which do not endanger our nonproliferation objectives. Despite the interest of ROC scientists in all aspects of the nuclear fuel cycle, we have not extended such cooperation to reprocessing and, in fact, have made clear our determined opposition to such activities. We do not believe that Taiwan's nuclear power program provides an economic justification for a national enrichment or reprocessing program. We have made clear that any attempt by the ROC to develop such programs will seriously jeopardize our cooperation in the peaceful uses of nuclear energy.

ROC POLICY CONCERNING NUCLEAR WEAPONS AND NONPROLIFERATION

The Republic of China has enunciated a consistent policy with respect to nuclear weapons and nonproliferation. The main elements of its policy are that:

The ROC has been a party to the NPT since its inception and will abide by its treaty obligations.

The ROC has no intention to develop nuclear weapons.

All nuclear facilities in the ROC are for peaceful purposes.

All nuclear facilities in the ROC are subject to IAEA safeguards. The IAEA's inspections have not revealed any irregularities.

Premier Chiang Ching-kuo publicly reiterated this policy last week following a meeting of his Cabinet. In doing so, the Premier publicly stated for the first time that the ROC does not plan to acquire a facility for reprocessing spent nuclear fuel. We welcome this commitment.

Over the past few years, American officials have made clear to the ROC this administration's determined opposition to any activities which would cast doubt on its commitment to nonproliferation. This position was again conveyed to the ROC early this month and resulted in assurances to us by the Premier similar to his public ones of last week. These have been subsequently confirmed in a note to us by the ROC stating that "the Government of the Republic of China has no intention whatsoever to develop nuclear weapons or a nuclear explosive device, or to engage in any activities related to reprocessing purposes." We are pleased with this forthcoming ROC position which should eliminate any ambiguities concerning nuclear activities on Taiwan. This development is continuing evidence of the seriousness

which we attach to preventing the spread of sensitive nuclear facilities. I can assure you, Mr. Chairman, that the ROC is fully aware:

That the United States is opposed to the proliferation of nuclear weapons and nuclear explosive devices.

That the United States is opposed to the spread of national reprocessing facilities, and

That actions by the ROC contrary to these policies would fundamentally jeopardize continued U.S. cooperation with the ROC in the peaceful use of atomic energy as well as other important relationships.

I can also assure you, Mr. Chairman, that the ROC is fully cognizant of section 305 of the International Security Assistance and Arms Export Control Act of 1976 which denies economic and military assistance to countries which import unsafeguarded national reprocessing facilities.

Our approaches to the ROC on nonproliferation have been supplemented by bilateral consultations which we have undertaken this year and previously with the governments of countries which are potential suppliers of nuclear equipment to Taiwan. These consultations have been designed to insure that the policies of various suppliers are compatible. The responses from other governments have been favorable.

Senator SYMINGTON. Would you name those countries?

Mr. HUMMEL. Yes I will, if you wish. I would honestly prefer to do that in a memo to you. It involves diplomatic consultations. If you press me, I shall do so.

Senator SYMINGTON. I am not going to press you on something which I think may involve the national security.

When you talk about other countries I won't press you on that. Proceed.

Mr. HUMMEL. The Republic of China, in common with an increasing number of other nonnuclear states, has the economic and scientific base from which to develop nuclear weapons or a nuclear explosive device, should they choose to do so, and if they were in a position to procure or produce the necessary quantities of weapons grade fissionable materials. Their declared national policy is not to acquire nuclear weapons or explosive devices, not to develop the technology which would enable them to produce materials required to accomplish this. I cannot overestimate the seriousness with which the U.S. Government would view any deviation from this declared policy by the ROC. I can assure you that we follow every aspect of Taiwan's nuclear program with the utmost diligence. Our contacts with Taiwan in the nuclear field have evolved over a period of years, and they will continue to do so in the future. Our cooperation in peaceful uses has been mutually beneficial.

U.S. TRAINING OF NUCLEAR SCIENTISTS

Senator SYMINGTON. May I ask what you mean by that sentence?

Mr. HUMMEL. In the sense that any trade transaction such as the sale of these four nuclear reactors, quite possibly two more, is mutually beneficial.

Senator SYMINGTON. In other words, we teach them how. If they change their policies to make atomic weapons while they buy the peacetime use of atomic energy from us—is that what you mean by mutually beneficial?

Mr. HUMMEL. No, sir.

Senator SYMINGTON. Then it is true what I have just said, that we are training and planning to continue to train nuclear scientists in their country at their expense?

Mr. HUMMEL. Yes; but we have not trained any of their personnel in techniques directly related to the manufacture of weapons.

Senator SYMINGTON. When you train people—I have tried so hard to make this point in regard to what was called at one time the atoms for peace plan—you are automatically also training them in atoms for possible war plans or possible weapons plans, are you not?

Mr. HUMMEL. Mr. Chairman, I understand your point quite well. Some areas of the technology that have spread throughout the world can be applied to bad uses, including those involving nuclear weapons, but I would not wish anyone to draw the conclusion that U.S. sales of nuclear power reactors for generating electric power are in any way motivated by an interest in allowing others to develop a nuclear weapons capability or that recipient countries necessarily have such a motive in purchasing power reactors.

Senator SYMINGTON. I am glad you put in the word "necessarily." May I again say these hearings are only being held because of what we read in the papers. Will you proceed? You are almost through.

Mr. HUMMEL. Our nonproliferation objectives have been maintained and their continued maintenance will be an essential aspect of our relationship with the ROC.

REPORTED COOPERATION BETWEEN TAIWAN AND SOUTH AFRICA

Senator SYMINGTON. Thank you, Mr. Secretary. In your statement you state that we are in a practical sense Taiwan's only source of reactors and enriched uranium fuel for its nuclear power program. I interrupted you there. I would like to be sure we nail it down. There have been reports that Taiwan and South Africa may be beginning to cooperate in the nuclear field. Do you have any information on this?

Mr. HUMMEL. We do know that Taiwan has purchased uranium, natural uranium under IAEA safeguards from South Africa. This uranium is processed into fuel rods in an inspection declared facility in Taiwan's research reactor.

Senator SYMINGTON. They could sell enriched uranium?

Mr. HUMMEL. So far as we know, South Africa does not have the capability to enrich it.

Senator SYMINGTON. But then you talk about relative enrichment. If they are going to use it for fuel, they have got to enrich U^{238} .

Mr. HUMMEL. No, sir, I am far from expert in this field, but this is metallic uranium that goes into a research reactor directly into manufactured rods. This is not enriched uranium.

Senator SYMINGTON. The rods are utilized for production of energy, are they?

Mr. LOCKE. No.

Senator SYMINGTON. Why do they purchase them?

Mr. LEVIN. Research.

Mr. HUMMEL. This is research reactors, this is not one to power generation reactors we are talking about.

RESEARCH DONE WITH URANIUM-238

Senator SYMINGTON. Will you supply for the record what research you would do with U^{238} ?

Mr. HUMMEL. Yes. I am not an expert in this field. We will supply it for the record.

[The information referred to follows:]

RESEARCH USE OF URANIUM-238

(Supplied by Department of State)

Research applications of natural uranium (U^{238}) can include: development of the technology for enrichment of uranium; development of mixed oxide (uranium-plutonium) reactor fuels; and directly as a fuel in certain types of research reactors, such as the Taiwan Research Reactor (TRR). The TRR, which uses U^{235} , has been in operation for approximately $2\frac{1}{2}$ years and has the capacity for many experiments, including work in nuclear and solid state physics, radio-chemical research, irradiation of biological samples, and studies of radiation effects on materials. The facility may also be used to produce radioisotopes for use in various medical and industrial applications. Plutonium is also produced, but would require reprocessing for separation.

Senator SYMINGTON. I know there are a lot of things you could do but—

Mr. HUMMEL. Mr. Chairman, I have some personal knowledge of some of the peripheral activities that are undertaken from visiting one of these reactors some years ago and I do know that they are engaged, the people in the Republic of China are engaged in a broad spectrum of research and activities in industrial fields, in agriculture, in irradiation of seeds and plants to produce desirable mutations, and in other similar activities.

Senator SYMINGTON. Presumably you are talking about something like the Candu reactor.

Mr. LOCKE. Sir, my name is Allen Locke from the Bureau of Intelligence Research, Department of State. The Candu reactor is the power version of the Canadian heavy water reactor technology. The reactor at the Institute of Nuclear Energy Research.

Senator SYMINGTON. I understand.

SOUTH AFRICAN PILOT PLANT FOR ENRICHMENT

South Africa has a pilot plant for enrichment which is not under safeguards?

Mr. HUMMEL. I do not know.

Senator SYMINGTON. Will you check that out?

Mr. HUMMEL. Yes.

Senator SYMINGTON. And supply the answer for the record.

Mr. HUMMEL. Yes.

[The information referred to follows:]

SOUTH AFRICA'S URANIUM ENRICHMENT FACILITY

(Supplied by Department of State)

South Africa announced in April 1975 that its pilot enrichment facility at Valindaba (near Pretoria) had begun operation. South Africa is not a member of the NPT and has not placed this facility under safeguards. We understand its purpose is to test on an operational basis South Africa's classified enrichment technology, with a view to constructing a commercial-scale enrichment plant dur-

ing the 1980s. South Africa recently made a formal offer to the IAEA regarding the application of safeguards to its proposed full-scale enrichment facility.

The current needs of the Republic of China for enriched uranium for fuel are being met through contracts with the United States, and the ROC has no additional requirement that would entail the provision of enriched uranium by other suppliers.

Senator SYMINGTON. Thank you very much, Mr. Secretary.

REMOVAL OF NUCLEAR WARHEADS FROM EUROPE

Before I yield to Senator Case, you were here this morning and we have been told through rumor, let me emphasize, the Defense Department would like to take some of the nuclear warheads in Europe out but that the State Department objects to that, and I mentioned the problem of Mrs. Myrdal's book, I read direct quotes of many influential Germans. Would this be entirely out of your field?

Mr. HUMMEL. I am sorry, that would be out. I am a far easterner by trade.

Senator SYMINGTON. You could be a pretty good westerner.

EFFECT OF TAIWANESE ATTEMPT TO DEVELOP NUCLEAR WEAPONS

Senator CASE. Thank you, Mr. Chairman. You stated, Mr. Hummel, that any attempt by Taiwan to develop nuclear weapons would jeopardize our nuclear relationship. Actually, it would jeopardize our overall relationship very seriously, wouldn't it?

Mr. HUMMEL. Yes, I mentioned in my opening statement that other important relationships would be jeopardized as well.

Senator CASE. Yes. That means our overall relationship?

Mr. HUMMEL. Yes.

Senator CASE. And in every important way?

Mr. HUMMEL. Yes.

Senator CASE. Including, I take it, such matters as foreign assistance?

Mr. HUMMEL. Of course.

Senator CASE. Military assistance, which is the major one?

Mr. HUMMEL. Yes.

OTHER FUEL ENRICHMENT ASSISTANCE SOUGHT BY TAIWAN

Senator CASE. Is Taiwan seeking assistance on fuel enrichment from any other country?

Mr. HUMMEL. Taiwan has had discussions with some third countries in the past for various aspects of reprocessing technology. As I mentioned earlier, when the chairman questioned me on it, we have discussed this matter with the governments of those third countries as well as with the Government of the Republic of China. None of these activities have gone forward or have been completed, and the present statement made by the Government of the Republic of China would preclude any such activities.

Senator CASE. The fact is that this small laboratory facility that they were constructing has now been abandoned?

Mr. HUMMEL. Yes.

DESIRED EXTENT OF ROC NUCLEAR PROGRAM

Senator CASE. How far do you think they want to go in their nuclear program?

Mr. HUMMEL. In the peaceful program, sir?

Senator CASE. Yes; because obviously you have said they don't want to go any further at all—

Mr. HUMMEL. I don't think we know. I don't think even their planners would be able to project how far, how many nuclear power reactors they would eventually purchase. They have pretty firm plans for six. This as I said would probably supply about 45 percent of their power generation needs. But as their economy develops and as the consumers use more and industries use more I don't know what their additional needs would be. I don't think anybody has put a theoretical lid on the number of reactors, power reactors, they would finally need.

COMPARATIVE SIZE OF ROC ECONOMY

Senator CASE. How large is their economy compared with Japan on the one hand and Korea on the other?

Mr. HUMMEL. Well, it is far smaller than the Japanese.

Senator CASE. Roughly.

Mr. HUMMEL. Their total GNP is about \$14 billion.

Senator CASE. As opposed to the astronomical Japanese GNP?

Mr. HUMMEL. Yes; I should know the figure, but I have forgotten.

Senator CASE. How does it compare with South Korea?

Mr. HUMMEL. They are ahead of Korea. It is larger than the Korean GNP, but, as you know, the Korean birthrate is also quite large. I am sorry, I could supply a figure, if you wish.

[The information referred to follows:]

GROSS NATIONAL PRODUCT OF REPUBLIC OF CHINA AND KOREA AND JAPAN
[U.S. dollars in billions]

Gross National Product	1975	1970	1966
Republic of China.....	14.4	5.7	2.8
Republic of Korea.....	18.8	8.3	3.0
Japan.....	482.9	202.9	91.2

Note.—Population (in millions): Republic of China, 16.1; Republic of Korea, 33.5; Japan, 111.

EFFECT ON KOREA IF TAIWAN DEVELOPED NUCLEAR WEAPONS

Senator CASE. What would be the effect on Korea if Taiwan should develop nuclear weapons?

Mr. HUMMEL. There would be effects throughout the area, including Korea and in Japan.

Senator CASE. Japan, too?

Mr. HUMMEL. Yes.

Senator CASE. What kind of effect? It wouldn't be a happy effect.

Mr. HUMMEL. There would certainly be a considerably increased intensity on the part of other countries to follow suit. It would be seriously destabilizing to our general interests, including our security interests there, and I think the interests of the people of the area.

Senator CASE. We have really ridden this subject pretty hard, haven't we?

Mr. HUMMEL. Yes, that is absolutely correct.

Senator CASE. We intend to continue?

Mr. HUMMEL. We do.

Senator CASE. I think, Mr. Chairman, that is about it.

Senator SYMINGTON. Thank you.

COMPLAINTS FROM OTHER COUNTRIES CONCERNING UNITED STATES-
REPUBLIC OF CHINA NUCLEAR COOPERATION

To the best of your knowledge, Mr. Secretary, have you received any complaints from any other country about our nuclear cooperation with Taiwan?

Mr. HUMMEL. No, sir; we have not.

Senator SYMINGTON. None of any kind?

Mr. HUMMEL. Not to my knowledge.

Senator SYMINGTON. Could you check for the record and see if there have been any complaints?

Mr. HUMMEL. I will, and if we produce any, I will supply it for the record.

[The information referred to follows:]

THIRD COUNTRY COMPLAINTS ABOUT U.S. NUCLEAR COOPERATION WITH TAIWAN

(Supplied by Department of State)

The Department of State has not received any complaints from other countries about our nuclear cooperation with Taiwan. Over the past year, several countries have requested the Department's assessment of nuclear activities on Taiwan, but such requests were not accompanied by complaints or any indication of dissatisfaction with U.S. cooperation with Taiwan in the peaceful uses of nuclear energy. On the contrary, as indicated in Assistant Secretary Hummel's opening statement, the United States in recent years has taken the initiative in successfully approaching several governments which are potential suppliers of nuclear equipment to Taiwan to ensure that they refrain from any activities inimical to our nonproliferation objectives in respect to Taiwan.

Senator SYMINGTON. Thank you very much. We appreciate your coming. We are sorry we were a little late.

Mr. HUMMEL. My pleasure.

[Whereupon, at 12:45 p.m., the subcommittee recessed, subject to the call of the Chair.]



NON-PROLIFERATION ISSUES

MONDAY, NOVEMBER 8, 1976

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
INTERNATIONAL ORGANIZATIONS, AND SECURITY AGREEMENTS
OF THE COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 4221, Dirksen Senate Office Building, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington and Case.

Senator SYMINGTON. The hearing will come to order.

OPENING STATEMENT

This morning we are going to hear from one of the great citizens of the world, one that all of us admire and respect, Ambassador Alva Myrdal of Sweden. Mrs. Myrdal, would you please come up to the witness table.

We welcome you here. You have served your country with distinction in many important posts: Minister of Disarmament, Ambassador to the 18-Nation Disarmament Committee, and Ambassador to India.

Recently Mrs. Myrdal, who is an authority on arms limitation matters, completed a provocative new book entitled, "The Game of Disarmament: How the United States and Russia Run the Arms Race."

After reading portions of an advance copy, it was our belief that Ambassador Myrdal's views would complement information received by this subcommittee in hearings held over the past 2 years. These hearings have centered on the proliferation of nuclear weapons, a situation which has been developing relatively rapidly for a time among a relatively small group of nations. Now, however, this proliferation would appear to be spreading to a much larger group.

As we now know, this can only bring increased instability and insecurity to all nations on this earth.

In this regard, it is interesting to note that five Harvard and MIT arms control experts, including Dr. George Kistiakowsky, the chief scientific adviser to the late President Eisenhower, recently stated their belief that nuclear war before the end of this century is now not only possible, but probable.

So, we would like to explore with you, Mrs. Myrdal, the current situation as you see it, including steps which you believe might curb this growing danger.

Incidentally, over the weekend there were some interesting stories about the development of new and smaller weapons and the desire of countries to keep their developments in this vital category secret.

It is our understanding that you have a statement which you may wish to read. Of course, you may handle your delivery in any way you see fit.

Please proceed, Ambassador Myrdal.

[Ambassador Myrdal's biographical sketch follows:]

BIOGRAPHY OF ALVA REIMER MYRDAL

Diplomat, Educator, Sociologist, and Writer.

Former Swedish Cabinet Minister, Ambassador, and Member of Parliament.

SERVICE IN GOVERNMENT OF SWEDEN

1955-61—Ambassador to India, Minister to Ceylon; 1955-58—Minister to Burma; 1960-61—Ambassador to Nepal; 1962-70—Member of Parliament (Senate); 1961-66—Ambassador-at-large; 1966-73—Cabinet Minister—Disarmament; 1969-73—Cabinet Minister—Church Affairs; 1945-47—Delegate to ILO Conferences in Paris and Geneva; 1946-56—Delegate to UNESCO Conferences in Paris and New Delhi; 1962-73—Member, Swedish Delegation to UN General Assembly (Deputy Leader—1967-73); 1962-73—Chief of Swedish Delegation to Disarmament Conference in Geneva; 1935-38—Secretary of Government Commission on Women's Work; 1943-47—Member of Royal Commission on the Handicapped; 1943-48—Member, Swedish Government Commission on Post-War Aid and Reconstruction; 1946-50—Member of Royal Commission on Educational Reform; 1964—Chairman of Government Committee on International Peace Research Institute; 1968-72—Chairman of Government Commission on Disestablishment of Swedish State Church; 1971-72—Chairman of Government Commission on Studies of the Future; 1972-73—Chairman of Government Delegation for Expanding International Laws Against Brutality in War; and 1976—Chairman of Government Committee on Extended Cultural Exchange with Foreign Countries.

SERVICE IN UNITED NATIONS

1949-50—Principal Director of UN Department of Social Affairs; 1951-55—Director of UNESCO Department of Social Sciences; 1964—Chairman of UN Expert Group on Resolving the Situation in South Africa; and 1972—Chairman of UN Committee on Disarmament and Development.

OTHER EXPERIENCE

1924-32—Teacher, Workers Education Association, Stockholm; 1932-34—Psychological Assistant, Central Prison, Stockholm; 1936-48—Director, Training College for Preschool Teachers, Stockholm; 1973-74—Visiting Fellow, Center for the Study of Democratic Institutions, Santa Barbara, California; 1974-75—Visiting Professor, MIT, Cambridge, Massachusetts (May 1974, March 1975, May 1975); and 1976—Visiting Distinguished Slater Professor, Wellesley College, Massachusetts.

OTHER ACTIVITIES

1935-38, 1940-42—Chairman of Swedish Federation of Business and Professional Women; 1938-47—Vice Chairman, International Federation of Business and Professional Women; 1943-48—Vice Chairman, Swedish Civic Organization for Cultural Relief in Europe; 1946-49—Chairman, World Council on Preschool Education; 1968-73—Chairman, Swedish Labor Party and Confederation of Trade Unions, work group on Reforms for Increased Equality; and 1976—Public Exhibition devoted to AM:s activities, Kulturhuset, Stockholm.

EDUCATION

1924—BA, Stockholm University; 1929-30—Rockefeller Fellow, United States; 1930-31—University of Geneva; and 1934—MA, Uppsala University.

HONORARY DEGREES

1950—Mt. Holyoke College, U.S.; 1962—Leeds University, England; 1964—Edinburgh University, Scotland; 1965—Columbia University, U.S.; 1968—Temple University, U.S.; 1971—Gustavus Adolphus University, U.S. (Doctor of Divinity); 1974—Brandeis University, U.S.; 1975—Gothenburg University, Sweden; and 1976—University of East Anglia, England.

PUBLICATIONS

1975—SIPRI Paper on The Right to Conduct Nuclear Explosions; 1976—"The Game of Disarmament" (pending)—Published as article, 1972 in *Impact* (UNESCO); 1968—"Women's Two Roles" (with V. Klein), rev. ed.; 1965—"Disarmament—Reality or Illusion?"; 1965—"Nation and Family" 2nd ed.; 1954—"America's Role in International Social Welfare" (with Dean Rusk, A. Altmeier); 1950—"Are We Too Many?" (with P. Vincent) UNESC9; 1944—"Post-war Planning"; 1943—"Women in the Community"; 1942—"Cross Section of Great Britain"; 1941—"Contact with America" (with G. Myrdal); 1935—"City Children"; 1934—"Crisis in the Population Question" (with G. Myrdal); and numerous contributions to publications in Swedish, English, French and German. See particularly articles on Disarmament in *Scientific American*, Oct. 1974, *Foreign Policy*, Spring 1975, *Bulletin of Atomic Scientists*, May 1975, *Pacem in Maribus V*, Spring 1975.

SPECIAL AWARDS

1970—Peace Prize of West Germany, with Gunnar Myrdal; 1973—Waterloo Prize of Hague Academy of International Peace; and 1975—Prize from the Royal Swedish Institute of Technology.

PERSONNEL DATA

Born: Uppsala, Sweden, January 31, 1902; Married: To Gunnar Myrdal, October 8, 1924; and Children: s. Jan, d. Sissela, d. Kaj.

(Sources: *International Who's Who in the World*) (brought up to date.)

STATEMENT OF ALVA MYRDAL, FORMER SWEDISH CABINET MINISTER, MEMBER OF PARLIAMENT, AND AMBASSADOR

Ambassador MYRDAL. Thank you, Mr. Chairman, for your very kind words of welcome. I am fully aware of the great honor that has been bestowed upon me by having been invited to testify today under your chairmanship on some of the contents of my forthcoming book, which is, as you yourself said, provocative. But it is, I assure you, non-aggressive.

I have submitted a statement and I will be glad to follow that as an outline.

Senator SYMINGTON. Excuse me, please, but would you pull your microphone a little closer. Thank you.

Ambassador MYRDAL. I will be glad to follow the statement I have submitted as an outline, but I will skip many sentences and paragraphs, and even pages. Let me at the outset underscore that my statement, as well as the book, deals with the problems of the arms race, not from the point of view of any individual nation, nor any bloc of nations; rather my duty is to present an international outlook, and it carries that message: How can we get to a world where reason and morality prevail in the various nations' decisionmaking about arms and disarmament.

Due to the time factor, if nothing else, I will, of course, be unable to cover the full range of issues raised in the book, and even the full range of issues on nonproliferation, issues which are so vitally debated in this committee, in the U.S. Congress as a whole, and in the press

as well as by alert citizens in this country. But in America it is, of course, considered from a national point of view, in the perspective of what are U.S. interests. That must be the main viewpoint. But my ambition must be to help steer any such debate toward a greater concern with the international aspect.

ISSUES DEALT WITH

In this statement I have chosen to dwell only on three points. The first one is the global aspect of what is currently taking place in the proliferation of the arms race: namely, the militarization of the Third World. This is certainly a most sinister dynamic change. The second issue is the repercussions in various regions of the two superpowers' competition for influence through political-military measures. I will focus my attention on the situation in Europe, as the prospective battlefield for what I call a transposed war, or threat of war, between the superpowers. The problems of European security I consider to be a legitimate interest per se, and it is examined under the triple aspect of what are the Russian, the American, and the European points of view.

The third issue is that of the military competition between the superpowers themselves, their gaming with each other, as I called it. The main viewpoint will be how their scenarios through what I analyze as a gross miscalculation are moving from a military buildup for deterrence toward preparing war-fighting capabilities. The result of their competition is not greater, but ever less security for themselves, and a total insecurity for the whole world.

It is without any doubt the main responsibility of the two superpowers, as they are leading the world in all aspects of the arms race, forward in it, while not leading in regard to disarmament.

As a postscript to my statement, I will try to answer what I know must be the eager question: is there no hope for a change of direction?

THIRD WORLD MILITARIZATION-CONVENTIONAL WEAPONS

Let me begin by trying to substantiate my accusation that the world is becoming militarized, and particularly so the Third World. All figures are well known to the members of this committee and I will skip them. But the astonishingly new feature is that the share in the colossal military outlay in the world which is taken by the countries which we categorize as underdeveloped, is rising at a particularly fast rate. As a matter of fact, the military is allotted a growing share of the poorer countries' resources, with that military expenditure rising more than their total GNP's [gross national products].

But I want to emphasize more strongly the political aspects of this phenomenon.

First is the responsibility of the advanced countries as being the advanced suppliers of those arms, not supplying them only in huge quantities, but also with highly sophisticated and expensive weapons. There has particularly been a strong upsurge in arms trade according to the new pattern of arms-for-oil deals. I illustrate that in my written statement.

But the acquisition of more and more arms also contributes to a strengthening of the military in the domestic affairs. When dictators

and oppressors take and keep power, they rely upon their military might, on weapons acquired and soldiers trained to use them. The installation of so many military regimes in Africa, Asia, and Latin America is among the prominent features of our time. The present-day power of generals and colonels is clearly related to procurement of arms, which is often given as military aid.

The main justification for the drives of the advanced countries to export arms is given as a concern for taking advantage of their technological progress, and thus, they assert, also to be able to protect their interests, to secure employment for their plants, their workers, and also their personnel engaged in research and development work. But surely, the ingenuity of present-day industrial societies should suffice to produce elaborate contingency plans for alternate, more constructive production lines.

The need for governments to establish such conversion plans was taken up as an international issue by a U.N. group of experts which I chaired. The conclusions of its report: *Disarmament and Development*, 1972, were in this respect quite hopeful, not least those relying on some studies made earlier by U.S. economic experts.

I would like to pay homage, as I do in my book, to the efforts of Senator McGovern for promoting planning for such conversion.

Quite apart from a country's stronger or weaker interest in national planning for its total economy, having conversion plans for defense industries should be a self-evident duty. In the international study I just mentioned we recommended that pressures should be exerted by the international community in order to get all governments to elaborate and submit alternative contingency plans so as to facilitate a halt to the arms race.

PROLIFERATION COURSE IN REGARD TO NUCLEAR WEAPONS

So far I have spoken of the spread of conventional weapons that amounts to a worldwide and accelerated proliferation. But a similar course is threatening, if not already underway, in regard to nuclear weapons.

You yourself, Mr. Chairman, made a very enlightening and electrifying speech on this subject in the U.N. session of 1974, when you openly gave the figures for how many hundreds of thousands of nuclear weapons the United States possessed.

The Non-Proliferation Treaty was expected to become an instrument to stop proliferation. It has been somewhat glorified afterwards: it has in reality been a strikingly inefficient agreement. But outside all restraints and controls of the NPT remain such important countries as Argentina and Brazil, India and Pakistan, Israel and most Arab countries, as well as South Africa. The so-called success of the NPT is a hollow one.

Of course, moreover, sales or negotiations for sales of more or less complete nuclear fuel cycles to countries such as Brazil and Pakistan have aroused more and more acrid criticism on the part of the countries which are loyal adherents to NPT restraints.

Recently the supplier countries have been suggesting stronger controls on exports of nuclear reactors, fissile material and particularly on reprocessing facilities. But to all my experience no controls, no curbs dictated by the supplier countries could be sufficient to hold back for

long nuclear weapon production by any country which is ambitious enough to procure for themselves the same weaponry as the great powers have.

So, my conclusion is that nothing will prevent a run toward world-wide proliferation of nuclear weapons except a change in the position of those nuclear weapon powers. I have repeatedly over the years summarized what I consider to be legitimate political demands on the part of the nonnuclear weapons countries, and particularly the nonaligned countries. I believe the vast majority of U.N. members hold to that position. A first and main political payment should be a grand gesture of historical significance: the nuclear-weapon powers—jointly, bilaterally, or unilaterally—should give a pledge never to attack non-nuclear weapons powers with such weapons.

But not even such a pledge might suffice. The nuclear weapon powers must themselves begin to sacrifice at least some of their claims to have a monopolistic right to possess such weapons. Therefore, the second price is to make IAEA safeguards truly meaningful, and that requires that the nuclear weapon powers themselves submit their nuclear programs to these safeguards. If nothing continues to be done on their own part, they thereby provide the justification, which could be opportunistically welcomed by pretenders to choose a nuclear weapon status. They would be only too apt to turn around to their favor the well-known argument: "What is good for General Motors," et cetera.

LIMITED WAR OVER EUROPE

My second subject is the one about limited war over Europe. When the superpowers extend their battle for influence toward wider regions of the world, their bipolar postures may to them seem as just reflecting their national interests. But to the nations subjected to these attempts, the matters must look totally different. Many of them deeply sense that their security interests are not the prime objectives for the moves of the competing superpowers. As a case in point, I might mention the turning of Diego Garcia in the Indian Ocean into a western bastion, and, on a wider scale, the ongoing militarization of the Indian Ocean by both sides, despite its being sharply protested by the littoral and hinterland states of the region.

But today I want to focus attention particularly on an area, much more at the crossroads of political concern, historically as well as of this day, namely, Europe.

Europe's present division between the two superpower blocs is not of its own making. The European nations, now so largely cured from their old war affliction, would themselves be much more ready to co-exist and cooperate than the actual, politically drawn sharp boundary line between the two blocs permits.

I dare to go even further. I know it is a daring statement I am making, but the military preparedness which so predominantly marks the European situation is not for a war of European making. It is expected to be, if it becomes a war, of superpower making. The ignition of any conceivable war where the superpowers would be brought into military action directly against each other would most certainly be sparked elsewhere. But—and this is a thesis which I have outlined and documented in ample detail in my book—its escalation could be

transposed to Europe, because here is where a battlefield is prepared, where massive armed forces are positioned against each other, where mobilization plans and target contingencies are established in concrete detail and, practically, ready for a press-button shooting.

The outcome of such a war for our part, and most directly for Central Europe, meaning in the first instance the two Germanys, is nothing less than utter devastation, mass killings, and probably annihilation.

When the NATO-Warsaw Pact constellation came into being, it was immediately brought to bear on nuclear weapons. Tactical nuclear weapons were introduced by Eisenhower in 1954 when Germany was still an occupied and unfree country. At that time the fatal prospect of this tying of West European defense to the wider nuclear strategies, first of the United States, was understood and sometimes even clearly expressed. Thus Helmut Schmidt, who was for a very long time the leading spokesman on military questions of the Social Democratic Party and is now the Chancellor of the Federal Republic of Germany, wrote explicitly :

A war which, though regarded as a "limited war" by the superpowers, would be no less than a war of annihilation for the countries of the battlefield.

That is, for Europe.

I complain in my statement that the effects of a war over Europe have been given too little attention.

At bottom, the anxious query at issue is whether the superpowers are really credible guarantors of peace and security in Europe. An early reminder that Europe, meaning Western Europe most specifically, should not rely upon doctrines of such defense in the form of retaliation was given by the then Prof. Henry Kissinger on several occasions. For instance, referring directly to Europe, he said in 1959 :

The defense of Europe cannot be conducted solely from North America, because however firm allied unity may be, a nation cannot be counted on to commit suicide in defense of a foreign territory.

The interesting thing is after that last statement Helmut Schmidt retorted in a straight reply :

That one sober sentence sums up all the doubts of European statesmen as to the efficacy of the strategy of nuclear retaliation.

What all of Europe must fear—West and East and neutral—is that both superpowers are most strongly interested in keeping any shooting nuclear war away from their own homelands. About this "sanctuary theory," which I give considerable play in my book, there has been very little open discussion. But I quote here a statement by a former ambassador to NATO, Harlan Cleveland, when he pointed out the dilemma :

It is natural for Americans to press for effective . . . use of nuclear weapons on the battlefield. But this conjures up for Europeans the picture of a Europe devastated while the United States and the Soviet Union remain intact.

I think the Europeans ought to join with the independent experts and state clearly that the tactical nuclear weapons which are now deployed in Europe, and particularly those in Central Europe, are not really needed in Europe and are not of positive value, neither for deterrence nor for defense. The risk the Europeans sense is rather that the presence of these nuclear weapons may draw nuclear fire unto their lands.

This is a vast subject, but I must stop from going further on that one to take up the last issue, and that is one concerning the two superpowers.

“GAMING” BETWEEN TWO SUPERPOWERS

A recent development which must deeply worry an internationalist is the drift from planning what is enough for deterrence to what is desirable for fighting a war. The world at large has a strong and positive interest in deterrence: to build a barrier against a war starting between the two superpowers. But just as much, all nations must be scared when the bipolar planning is on many score going far beyond strategies for deterrence. War-fighting capabilities are built up, both by augmenting the quantities of nuclear weapons in their strategic arsenals and by drastically improving their qualities, not the least by developing new generations of nuclear weapons such as cruise missiles, precision guided munitions, et cetera. This is, in essence, preparing for World War III.

The general public is not kept aware of the ominous impact of this never-ending competition, particularly on the qualitative side. We are all told to admire what is achieved or about to be achieved by SALT. But SALT is not much more than an institutionalization of the arms race at its present point, and even so harnessing not more than the number of delivery vehicles; the numbers of warheads would under the SALT plans be allowed to increase by 1985 to nearly 20,000 on the U.S. side, and more than 11,000 with heavier throw-weight on the Soviet side.

This stupendously large and incessantly growing arsenal is by both sides claimed as needed for national security. But the knowledge is now becoming commonplace among independent experts that the increase in armaments has not resulted in any commensurable increase in aggregate national security for the world. A considerable body of evidence indicates that a mutual stepping up of armaments leads to a decrease in national security. Also, for the two superpowers themselves, they cannot gain greater security through the arms race. Their nuclear weapons strength long ago exceeded what might be needed even for a “terror balance,” that is, for a deterrent that prohibits both of them from using force against the other, knowing that retaliation lies in store at the already existing level of overkill.

Realistically, the problem should be posed as to just how much weaponry is needed for a strategy of deterrence. The relevant question is how much is enough, and the answer to that must be a psychological evaluation of how much a prospective enemy would tolerate before he retaliated and initiated an escalation which might well lead to mutually suicidal results.

In the beginning of the 1960's, when the multilateral disarmament negotiations started in earnest, the U.S. estimate of the number of missiles-cum-warheads needed hovered around 400. So, we ask, why is the estimate of missiles needed in Vladivostok terms 2,400, with the number of warheads allowed to multiply manyfold by MRV and MIRV missiles? Why should the aim for 1985 be for each of the superpowers to be capable of destroying the other not 50 times over, as at present, but 100 times over?

I will not go through these calculations which are put forth in great detail by the SIPRI Institute annual publications, particularly in the SIPRI yearbooks. I think what has gone wrong in the calculations is instead of asking the appropriate question, "how much is enough," one is following an erroneous idea of "matching." Just observe what the other side has, or is more or less correctly believed to plan, and then set out to overreach it. This is a fundamental problem for the future, even for the near future.

RECOMMENDATIONS

In this brief resumé I have refrained from making any specific policy suggestions. The members of this committee have so many proposals under consideration and powerful possibilities to widen the discussion for assuring world security.

But I would just with a few words indicate some of the recommendations which are listed in my last chapter. "In Conclusion." A main such conclusion is that the two superpowers are so militarily overinsured that there is ample opportunity for them safely to take brave new steps, even unilaterally. We could then rightly expect considerable progress toward disarmament, the pattern following the well-known mutual chain reaction pattern.

I have set out some suggestions for such a step-by-step agenda. Here I only wish to mention that it would culminate in an agreement on a "minimum deterrent," leaving some, but few and well-controlled nuclear weapons in the hands of the great powers. I am not asking them to denude themselves totally of these weapons. I do this on two points: One is that the United Nations should not, in my view, be the trustee of nuclear weapons; and second, that as the fruit of the tree of knowledge has become available to man, it would be a wanton idea to try to re-create the state of innocence.

But even if the assumption would not come true that the superpowers would be willing to lead the course to disarmament, I have also a long list of measures which the lesser nations could undertake on their own responsibility. Any such bypassing of the superpowers is not desirable, but it may become necessary to spur a more positive cooperation. That list for more vigilant action by lesser nations includes, for instance, a comprehensive ban on chemical weapons; it also recommends a virtually immediate establishment of an International Verification Agency, to begin with on an interim basis. Several more such independent and positive actions can be taken on the basis of majority decisions in the United Nations.

I have stressed the responsibilities of the lesser states to take independent action and not wait for the great powers. But I cannot believe that the superpowers will for long be as negativistic as they have been hitherto in regard to disarmament. I end my book by expressing a great trust in the peoples of these two countries, and a fervant hope that their leaders—I even appeal to new leaders—will come to choose a strategy of peace, of reason, of truth.

Thank you, Mr. Chairman.

[Ambassador Myrdal's prepared statement follows:]

PREPARED STATEMENT OF ALVA MYRDAL

It is a great honor to have been invited to testify, under your Chairmanship, before the subcommittee on Arms Control, International Organizations and Security Agreements and to present some thoughts which have developed in my book, "The Game of Disarmament: How the United States and Russia Run the Arms Race," which is due shortly from the presses.

Let me at the outset explain that my statement today as well as the book deals with the problems of the arms race, not from the point of view of any individual nation, nor any bloc of nations. Rather, I wish to emphasize an international outlook, because what is sorely lacking today is a global perspective on the results of national decisionmaking. Somebody must have the ambition to try to foresee what a future historian might say about the conduct of the world's political and military affairs in this era of ours. The book, as its title indicates, carries that kind of a provocative message: how can reason and morality be made to prevail in the various nations' policymaking about arms and disarmament?

The implications of this provocative but non-aggressive approach will, of course, become more evident when the book is available in its full length and editorially polished version. It will be a pleasure to present a complimentary copy to all committee members, those of this subcommittee as well as the full membership of the Senate Committee on Foreign Relations.

When at the end of 1973 I left my post as member of the Swedish Cabinet, and having for twelve years carried the main responsibility for disarmament matters, I felt it to be a compelling duty to do whatever I could to help stem the developments which rush our world towards a more and more disastrous militarization which is in reality against the interests of all our nations, against all reasons and against all our deeper sense of morality.

Due to the time factor, if nothing else, I will of course be unable to cover the full range of issues raised in the book, issues which are so widely debated in this Committee, in the United States Congress as a whole, and in the press as well as by alert citizens in this country. But in America it is considered from a national point of view, in the perspective of what are United States interests. My ambition must be to help steer such debates towards a greater concern with the international aspect both as to the analysis of the prevalent situation and its causative factors.

In this statement I have chosen to dwell only on three points, each of which, of course, carries considerable ramifications. The first one is the global aspect of what is currently taking place in the arms race, namely the progressing militarization of the Third World at a now accelerating pace. This is certainly a most sinister dynamic change. This issue directly relates (a) to the arms trade in conventional weapons, and (b) to the risk of proliferation of nuclear weapons. (Reference to Chapters V and VI in my book).

The second issue is the repercussions in various regions of the two superpowers' competition for influence through political-military measures. I will focus my attention on the situation in Europe, as the prospective battlefield for what I call a "transposed" war or threat of war between the superpowers. The problem of European security, which I consider a legitimate interest per se, is examined under the triple aspect of what are (a) the Russian, (b) the American, and (c) a European point of view. (Reference to Chapter II.)

The third issue is that of the military competition between the superpowers themselves, their "gaming" with each other, as permeating all their military planning and posturing. The main viewpoint will be how their scenarios are moving from a military build-up for deterrence, through what I analyze as a gross miscalculation towards preparing war-fighting capabilities. The result of their competition is not more, but ever less security for themselves, and a total insecurity for the whole world. (Reference to Chapter IV.)

Without any doubt the main responsibility for these ominous developments lies with the two superpowers, leading the world as they are in all aspects of the arms race, while not so in regard to disarmament.

As a postscript to my statement I will try to answer what I know must be the eager question: is there no hope for a change of direction? I want to end on a positive note by indicating steps which are urgently necessary, and which could be taken, in order to stem the course to disaster.

I. THE MILITARIZATION OF THE THIRD WORLD

Let me begin by trying to substantiate my accusation that the world is becoming militarized, that we are more and more deeply enmeshed in a weapons cul-

ture. The global figure for military expenditures is in the order of 300 billion dollars a year, to quote a rounded figure, repeatedly used also by the United Nations Secretary General in order to imprint it on the minds of everybody.¹ But the astonishing new feature is that the share in this colossal outlay which is taken by countries which we categorize as underdeveloped, is rising at a particularly fast rate. The Third World part of the global military expenditures rose from 3.2 per cent in 1955 to 12.3 per cent in 1974, without any corresponding increase in these countries' share of the world's financial resources. As a matter of fact the military is allotted a growing share of their own resources: while between 1963 and 1973 their military expenditure rose with 7.3 per cent; their total GNP rose with less, that is 5.8 per cent.² As we all know, the rate of increase on the military side has continued to rise since 1973, and that in an astonishing measure.

These dry figures reflect the fact that the arms race is spreading like a cancer to all parts of the world body, and, of course, harming most its weakest, most vulnerable members.

The growth of military power in so many nations which have little economic and technological capacity to build up their own arsenals along modern lines, is directly related to the issue of the arms trade, with the value of the flow of arms now running to some 20 billion dollars annually, to apply the same kind of uncertain but pedagogically useful approximation. A good deal of that trade occurs between the developed countries themselves. But a large and spectacularly growing part is in the form of a bartering between the technologically advanced and the less advanced countries. Until recently this could be translated as from the richer to the poorer countries, but now, with the monopolistic rise in oil prices, countries like Iran and several Arab countries have suddenly become very rich and these countries have become major importers not only of huge quantities but also of highly sophisticated and expensive weapons. Besides the superpowers' continued deliveries to them, almost all the developed Western countries, in the wake of the 1973 Middle East war and the Arab boycott, have been racing to please the Arabs and simultaneously reap profits. There has been a resultant strong upsurge in trade according to the new pattern of arms-for-oil deals. When contracted orders are filled, Kuwait, for instance, with only about a million inhabitants will have one of the world's most modern air defense systems, and all the Gulf sheikhdoms are acquiring sophisticated counter-insurgency weaponry.³

The effects of this spread of the arms race to all corners of the globe has wide ramifications, military as well as political. The production and export of armaments, whether as sales or as grants, encourages nations to prepare for and engage in hostilities. This has proved particularly important in the new underdeveloped countries. Such increased weapons procurement may transform minor local conflicts into major confrontations. The recent wars in the Middle East have been crucially tied to arms deliveries which have thrown more and more fuel on a conflict that otherwise might have been kept at a smoldering low.

The inclination of governments to start or confine local wars is continually being bolstered and materially encouraged from the outside and, at the same time, the propensity to make war more devastating is increased.

Also, the acquisition of more and more arms contributes to a strengthening of the military in the domestic affairs. When dictators and oppressors take and keep power, they rely upon their military might, on weapons stored, and soldiers trained to use them. The installation of so many military regimes in Africa, Asia, and Latin America is among the prominent features of our time. This present-day power of generals and colonels is clearly related to procurement of arms which is often a direct result of military aid. And, for policing their nations, ordinary weapons as tanks and machine guns count.

The militarization of political power is especially prevalent in new countries without firm traditions of the civilian government controlling the military. But even countries with an age-old tradition of civilian culture and democratic institutions are not immune to the danger of militarization. Most generally—and here I do not think I can exonerate any country—the hegemony of military priorities and the vested interests involved in the arms race are at present creating obstacles

¹ Kurt Waldheim, Foreword, *The United Nations and Disarmament 1970-1975*, United Nations, New York 1976.

² See, e.g., a most recent presentation by Byron Doenges, *The International Arms Trade, in Challenge*, May-June 1976, with figures derived from the 1976 report by ACDA.

³ SIPRI (Stockholm International Peace Research Institute), *SIPRI Yearbook*, 1975, Stockholm, 1975.

to disarmament. It is ominous that foreign affairs are more and more generally discussed in terms of military strategies, undermining peaceful international cooperation as a way of the future, before it has even been given a chance.

This pervasive effect of militarism germinating everywhere should be given greater attention in connection with other issues on the agenda of the world community, those of colonialism, apartheid, human rights, refugees, foreign aid, and related problems of our marred civilization.

The connection between the international flow of arms and this strengthened militarization of crucial parts of the world emphasizes the responsibility of the advanced countries. On the part of the largest arms suppliers, the two superpowers, the basic motivation is to expand their political influence. On the part of the other suppliers, and prominent among them are particularly France and Britain but increasingly also Germany, the main interest must be to reap economic profits. As a justification for their drives to export arms, all advanced countries voice a concern for taking advantage of, and enhancing, their technological progress and thus also be able to protect the interests to secure employment for their plants, their workers and also their personnel engaged in research and development work. But surely, the ingenuity of present-day industrial societies should suffice to produce elaborate contingency plans for alternate, more constructive production lines.

The need for governments to establish and report such conversion plans was taken up as an international issue by a UN group of experts, which I chaired. The conclusions of its report, "Disarmament and Development" (1972), were in this respect quite hopeful, not least those relying on some earlier studies by U.S. economic experts. And quite apart from a country's stronger or weaker interest in national planning for its total economy, having conversion plans for defense industries should be a self-evident duty. Governments have, as the monopolistic consumer of all weapons but handguns, taken direct or indirect control of the production for defense; government contracts sometimes, as in the aerospace industry, cause giant swings in starting or stopping a production line. In essence, conversion plans for defense industries are not different from the planning of future activities that any big corporation finds indispensable on economic grounds.

On the basis of the international study just mentioned, we recommended that pressure should be exerted by the international community in order for governments to elaborate alternative contingency plans in advance so as to facilitate a halt to the arms race.

So far I have spoken of the spread of conventional weapons, that amounts to a worldwide and accelerated "proliferation." But a similar course in threatening, if not already under way, in regard to nuclear weapons. The Non-Proliferation Treaty, the once so glorified NPT, that entered into force in 1970, must in hindsight be judged to have been mainly an attempt to codify the monopoly position of the nuclear-weapon powers. They were then five and supposed to so remain. Only three of them did sign and ratify the Treaty, while China and France adamantly held out against it. Worse, the crucial so-called "threshold" countries, meaning those being both technologically and economically able to produce nuclear weapons on their own, only very few have adhered to the Treaty. Honorable mention should be made of the early unilateral declarations of Canada and Sweden, renouncing nuclear weapons, and understanding that the possession of nuclear weapons is no asset, at least not to smaller nations. So their ratification came automatically. Recently the Common Market countries and Japan have ratified the Treaty to abstain from procuring nuclear weapons. But outside all restraints and controls of the NPT remain such important countries as Argentina and Brazil, India and Pakistan, Israel and most Arab countries, as well as South Africa. The so-called success of the NPT is thus a hollow one.

The most recent events in this field are no more auspicious. The NPT Review Conference held in May 1976 was, it must be openly admitted, a failure with no encouraging steps forward being taken. While the non-aligned countries submitted a number of positive suggestions, the two superpowers, evidently in collusion, just stonewalled any attempts to bring the NPT provisions more in line with general international ideals.

Moreover, both then and later, sales or negotiations for sales of more or less complete nuclear fuel cycles to countries such as Brazil and South Korea have for obvious reasons aroused more and more acrid criticism on the part of the loyal adherents to NPT restraints.

In view of these developments and the growing scare on the parts of environmentalists and large groups of civilians about the stupendous increase in nuclear

energy reactors and their concomitant production of plutonium, the supplier countries have now been suggesting stronger controls on exports of nuclear reactors, fissile material and particularly on reprocessing facilities. But no controls, no curbs dictated by the supplier countries will be sufficient to long hold back from nuclear weapon production any country, ambitious enough to procure for themselves the same weaponry as the great powers have.

Without going into details of this just now highly topical subject, with which my audience is so familiar, I must state as my considered view, shared by many and probably the majority of nations outside the two superpower blocs, that nothing will prevent a run towards worldwide proliferation of nuclear weapons except a change in the position of the nuclear weapon powers. I have devoted two long and detailed chapters (VI and VII) in my book to this issue. Here I can only translate the feelings of non-nuclear-weapon countries by referring to statements often made, demanding two sets of reforms, one relating to the substance of the Treaty regulations and one to national security needs, considered to be urgent. Both stem from the conviction that the NPT is a grossly discriminatory Treaty. Let me summarize the substantive demands for a universal submission to control by all nations by quoting a near-ultimatum by India, the first nation outside the Nuclear club of Five to discharge a nuclear explosive device:

Now, as we have explained India's view in regard to verification, inspection, and a system of safeguards, it should be clear that we are in favour of universal, functional, and nondiscriminatory safeguards which apply to all, whether they are nuclear-weapons States or non-nuclear-weapons States, and that they apply to all programs. It is not possible for us to agree to a system of verification and inspection which would be applicable to the peaceful activities of non-nuclear-weapons States only; or, at best, applicable to the peaceful activities of all States, while leaving open the military activities of nuclear-weapons States.⁴

I have repeatedly over the years summarized what I consider to be legitimate political demands on the part of the non-aligned countries, and, I believe, still the vast majority of all so far non-nuclear-weapon powers. A first and main political payment should be a grand gesture of historical significance: the nuclear-weapons powers—jointly, bilaterally, or unilaterally—should give a pledge never to attack non-nuclear-weapons powers with such weapons.

Not even such a pledge might suffice. The nuclear-weapon-powers must themselves begin to sacrifice at least some of their claims to have a monopolistic right to possess such weapons, and thereby also begin to fulfill their own explicit promises in the Non-Proliferation as well as the Test-Ban Treaties: to pursue negotiations in good faith to achieve at the earliest possible date a cessation of the nuclear arms race.

If the nuclear-weapon-powers, and in the first instance the two superpowers, are not prepared to pay the price for making non-proliferation of nuclear weapons effective, they thereby provide a justification, opportunistically welcomed by pretenders to choose a nuclear-weapon status. Those would be only too apt to turn around to their favor the well-known argument: "What is good for General Motors . . ."

II. "LIMITED WAR" OVER EUROPE?

When the superpowers extend their battle for influence towards wider regions of the world, bipolar postures may to them seem as but naturally reflecting their national interests. But to the nations subjected to these attempts, the matters must—it has to be understood—look totally different. Many of them deeply sense that their security interests are not the prime objectives for the moves of the competing superpowers; yes, some may feel that their national independence is in jeopardy.

Of the many examples that spring from the pages of my book as well as from daily press reportings, I will just mention as a case in point the turning of Diego Garcia in the Indian Ocean into a bastion. And, on the wider scale, the ongoing militarization of the Indian Ocean by both sides, as it is sharply protested by the littoral and hinterland states of the region. This is testified by urgent resolutions in the United Nations, carried with overwhelming majority by the nations concerned. As it is phrased in recurrent resolutions:

"Concerned at recent developments that portend the extension of the arms race into the Indian Ocean area, thereby posing a serious threat to the maintenance of such [peaceful] conditions in the area."⁵
Or again in 1974:

⁴ Statement in the United Nations General Assembly, First Committee, November 20, 1974.

⁵ General Assembly Resolution 2832 (XXVI) 1971.

"Calls upon the great Powers to refrain from increasing and strengthening their military presence in the region of the Indian Ocean as an essential first step towards the relaxation of tension and the promotion of peace and security in the area."⁶

The defenders of the national independence and security of great populations in Asia and also Africa and Oceania explicitly do not want to be bonded by military interests of other, distant powers, however great.

But today I want to focus attention particularly on an area, much more at the crossroads of political concern, historically as well as of this day: Europe. Without doubt, that region has been the one most directly responsible for the outbreak of the two World Wars which have so shamefully marred the record of our supposedly civilized region. But Europe's present division between the two superpower blocs is not of its own making. The European nations, so largely cured from the war affliction, would themselves be much more ready to co-exist and cooperate than the actual, politically drawn sharp boundary line permits.

Although my assertions in this brief form necessarily suffer from a lack of qualifications, I want to go further: the military preparedness which so predominantly marks the European situation is not for a war of European making. It is expected to be a war of superpower making. The ignition of any conceivable war where the superpowers would be brought into military action directly against each other, would most certainly be sparked elsewhere. But—and this is a thesis which I have outlined and documented in ample detail in my book—its escalation could be "transposed" to Europe. Because here is where a battlefield is prepared, where massive armed forces are positioned against each other, where mobilization plans and target contingencies are established in concrete detail and, practically, in press-button shooting position.

That this is the general situation will, I believe, be recognized on both the American and the Russian side although their scenarios are strikingly different as to the involvement of such a war through the stages of conventional war, "limited nuclear" war and all out exchanges of intercontinental nuclear weapon strikes. But we who are the people, the human beings living in Europe are most concerned with the possibility of that frightening middle case of a "limited war" in Europe, which is also the one for which the discussion in expert circles is most alive and documented. Because the outcome of such a war for our part, and most directly for Central Europe, meaning in the first instance the two Germanies, is nothing less than utter devastation, mass killings, probably annihilation.

When the NATO-Warsaw Pact constellation came into being, it was immediately brought to bear on nuclear weapons. They were introduced by Eisenhower in 1954 when Germany was still an occupied and unfree country. The fatal prospect was over the first decades understood and sometimes even clearly expressed by political leaders. Helmut Schmidt was for a long time the leading spokesman on military questions of the Social Democratic Party and is now the Chancellor of the Federal Republic of Germany. In 1971 he wrote: "We have thus sketched out NATO's dilemma regarding deterrence: effective defense of Europe would only be possible for a short time or in a geographically limited area—and it would lead rapidly to the destruction of Europe."

And he reiterated: "a war which, though regarded as a 'limited war' by the superpowers, would be no less than a war of annihilation for the countries of the battlefield."⁷

These effects of a war "over Europe" have been given but scant attention. The most thoroughgoing study of the varying latitudes of destruction, by Carl Friedrich von Weizsäcker, seems not even to have been translated into English.⁸ His 700-page collection of detailed expert analyses devoted to apprising the consequences to West Germany's civilian population of a series of war scenarios with differing levels of input of nuclear weapons. Even a brief and locally limited war could mean ten million deaths and cause total destruction of West Germany as an industrial society. Escalation to blind utilization of existing weapons capabilities could mean the extinction of all life in Germany.

The European partners in NATO have preferred to have little public attention directed toward the possible consequences of their NATO allegiance. Perhaps they felt that they could not handle a twofold argument—continuing to appeal to the Americans for military commitment while informing the people at home about the insecurity involved. The remarkable thing is that the public has acquiesced.

⁶ General Assembly Resolution 3259 A (XXIX) 1974.

⁷ Helmut Schmidt, "The Balance of Power: Germany's Peace Policy and the Super Powers," trans. from German, London 1971.

⁸ Carl Friedrich v. Weizsäcker, ed., *Kriegsfolgen und Kriegsverhütung*, Munich 1971.

Even in the non-aligned Western countries there has been astonishingly little discussion of these awkward issues or studies examining the consequences of various scenarios, for example, those involving the use of the thousands of tactical nuclear weapons deployed in the midst of Europe. These nonaligned neighbors to NATO countries have demonstrated a kind, but ultimately not very helpful, discretion in questions which concern the destiny of the continent as a whole.

At bottom, the anxious query at issue is whether the superpowers are really the credible guarantors of peace and security in Europe. An early reminder that "Europe", meaning Western Europe most specifically should not rely upon the earlier prevailing doctrine of massive retaliation was given by the then professor Henry Kissinger in an interview in 1958: "What it will mean is that in every crisis an American President will have to make the choice whether a given objective is worth the destruction of American cities. The American President will have to decide whether Beirut or whatever the issue may be is worth thirty million American lives. In practice I am afraid the American President will have to decide that it is not worth it and will therefore encourage the piecemeal taking over the world by Soviet aggression."⁹

Referring more directly to Europe, Kissinger wrote in 1959: "The defense of Europe cannot be conducted solely from North America, because . . . however firm allied unity may be, a nation *cannot be counted on to commit suicide in defense of a foreign territory.*"¹⁰ (Emphasis added.)

To that last statement, Helmut Schmidt, quoting Kissinger's view on limited war, retorted in a straight reply: "that one sober sentence sums up all the doubts of European statesmen as to the efficacy of the strategy of nuclear retaliation."¹¹

The discussions referred to in this section have for obvious reasons concentrated more on the NATO side than on the Warsaw Pact one. In regard to doctrines it is the United States that have been eager to promise, first massive retaliation but later changed to "flexible response", the latter doctrine now also accepted by the NATO allies. The Russians have been more secretive about their strategic planning. (Reference to Ch. II, Section 4.)

What all of Europe must fear—West and East and neutral—is that both superpowers are most strongly interested in keeping any shooting nuclear war away from their own homelands. About this "sanctuary theory," which I give considerable play in my book, there has as usual been a somewhat more open discussion in the United States than anywhere in Europe. It has then also been understood, that the consequences in terms of sacrifices of human lives and damage to civilization which present scenarios entail, are ominous indeed. As a former ambassador to NATO, Harlan Cleveland, has pointed out: "It is natural for Americans to press for effective, which is to say large-scale, use of nuclear weapons on the battlefield—enough to 'stop the enemy in his tracks.' But this conjures up for Europeans the picture of a Europe devastated while the United States and the Soviet Union remain intact."¹²

The practical conclusion is that the Europeans, if they carefully examined and frankly expressed the views which correspond to their true interests should agree with what I have tried to express on their behalf. Or, as I said in the book, they should, if they were enlightened participants in a dialogue about the defense of Europe, join with the independent experts and state it clearly: the tactical nuclear weapons, now deployed in Europe and particularly those in Central Europe, whose location is, of course, no secret to any prospective attacker, are not needed in Europe and not of positive value, neither for deterrence nor for defense. The risk the Europeans sense is rather that the presence of these nuclear weapons may draw nuclear fire unto their lands.

III. CAPABILITIES FOR DETERRENCE OR WAR-FIGHTING?

A recent development which must perforce deeply worry an internationalist is the drift from planning what is enough for deterrence to what is desirable for fighting a war. The world at large has a strong and positive interest in the first purpose: to build a barrier against a war starting between the two nations who are rightly labelled superpowers, as each of them has the capacity to destroy our

⁹ "Second Edition: Limiting War: A Younger Henry Kissinger Interviewed by Mike Wallace," reprint of a pamphlet originally published by the Fund for the Republic in 1958. "The Center Magazine," vol. 4, no. 1 (January-February 1971), p. 56.

¹⁰ Henry A. Kissinger, "The Search for Stability," *Foreign Affairs*, July 1959, p. 548.

¹¹ Helmut Schmidt, "Defense or Retaliation: A German View," trans. from German, New York 1962.

¹² Quoted in John Newhouse, ed., "U.S. Troops in Europe: Issues, Costs, and Choices," Washington 1971.

civilization. But just as much all nations must be scared that the positioning within the bipolar frame is on many scores going far beyond strategies for deterrence. War-fighting capabilities are built up, both by augmenting the quantities of nuclear weapons in their strategic arsenals (the numbers of warheads even more than delivery vehicles) and by drastically "improving" their qualities, not least by developing new generations of nuclear weapons ("miniinukes" with higher yields in relation to weight, cruise missiles, Precision Guided Munitions (PGM), etc.). This is, in essence, preparing for World War III.

The general public is not kept aware of the ominous impact of this never-ending competition. We are all told to pause and admire what is achieved or about to be achieved by SALT. But SALT is, of course, nothing but an institutionalization of the arms race, and even so harnessing not more than the number of delivery vehicles; the numbers of warheads would under the SALT plans be allowed to increase by 1985 to nearly 20,000 on the U.S. side and more than 11,000 with heavier throw-weight on the Soviet side.¹³ This is just one of the calculations possible, enough to demonstrate that SALT, instead of the present plans, would need to prescribe a very considerable freeze and reductions in order to earn the right to be considered as meaningful for disarmament.

The stupendously large and incessantly growing arsenals are by both sides claimed as needed for "national security." But the knowledge is now becoming commonplace among independent experts and writers that the increase in the quantity, quality, and cost of armaments has not resulted in any commensurable increase in aggregate national security for the world. A considerable body of evidence indicates that a mutual stepping up of armaments leads to a decrease in national security, that is, safety against attacks, also for the two superpowers themselves.

They cannot gain greater security through the arms race. Their nuclear-weapons strength long ago exceeded what might be needed even for a "terror balance," that is, for a deterrent that forbids both, knowing that retaliation lies in store at the already existing level of overkill, to use force against the other. Temporary gains on one or the other side cannot make it more tempting to use nuclear weapons for an attack. In addition, competition, inherent in the arms race, tends to make relative superiority unstable.

This element of instability in the arms race is a pending world danger. The dangers of a collision are accentuated by technological development itself, as warning times steadily decrease, thus making it more and more probable that war might occur through technical accidents and errors. This is illustrated by the fact that the time required for inter-hemispheric delivery of nuclear bombs by missiles has shrunk to about ten minutes. The missile has also drastically shortened the warning time and heightened the surprise element possible between neighboring nations on a continental land mass. The mechanical complexity and increasingly automated functioning between signal received and attack released makes national security more and more threatened by technical hazards.

Realistically, the problem should be posed as to how much weaponry is needed for a strategy of deterrence. The relevant question is "how much is enough," and the answer to that must be a psychological evaluation of how much a prospective enemy would tolerate before he retaliated—and initiated an escalating exchange of mutually suicidal effects. It has been argued that the low figure of one bomb is probably enough for a credible deterrent, as in a statement by former Special Assistant to the President for National Security Affairs, McGeorge Bundy, made shortly after leaving his post: "In the real world of real political leaders—whether here or in the Soviet Union—a decision that would bring even one hydrogen bomb on one city of one's own country would be recognized in advance as a catastrophic blunder; ten bombs on ten cities would be a disaster beyond history; and a hundred bombs on a hundred cities are unthinkable."¹⁴

In the beginning of the 1960's when the multilateral disarmament negotiations started in what was then believed to be an earnest attempt to reach results, the U.S. estimate of the number of missiles-cum-warheads hovered around 400. Why is the estimate of missiles needed in Vladivostok terms 2,400, with the number of warheads many-fold multiplied by MRVs and MIRVs? Why should the aim for 1985 be for each of the superpowers to be capable of destroying the other not 50 times over as at present, but 100 times over?

¹³ SIPRI Yearbook 1975.

¹⁴ Quoted with concurrence by Herbert York, "Nuclear Deterrence: How to Reduce the Overkill." Fred Warner Neal and Mary Kersey Harvey, eds., *Pacem in Teris III*, vol. II (Santa Barbara, Calif.: Center for the Study of Democratic Institutions, 1974), p. 26.

Something has gone awry in the military mathematics. I call it a Gross Miscalculation or even a Gross Folly. The origin of the erroneous thinking is that the concept of deterrence, for which the appropriate question is "how much is enough," has been abandoned in favor of an erroneous idea of "matching." Outside all reasonable considerations the guiding ambition has become just to observe what "the other side" has, or is more or less correctly believed to plan to acquire, and then set out to "match" it. In reality, it is an incessant game of overreaching.

I deeply regret to have to state these facts in such a blunt manner. But it is even more regrettable that we should be so few, some inside experts in the United States and then some outsiders like myself, to state what is plain truth to anybody who considers reality, and does not stop with what is politically publicized as such. In my book I have not hesitated to characterize the gaining for war-fighting capabilities a "terminal psychosis." It is, really, playing with the security, yes possibly the very existence of our world.

Afterword

In this brief resumé of some thoughts developed in my book "The Game of Disarmament", I have refrained from making any direct suggestions as to how the sorrowful state of world affairs could be corrected. This Committee and the U.S. Congress and Administration have many proposals under consideration and powerful possibilities to widen the discussion for assuring world security.

Let me just with a few words indicate some of the recommendations which are listed in my last chapter, "In Conclusion". A main such conclusion is that the two superpowers are so militarily overinsured, that there is ample opportunity for them safely to take brave new steps, even unilaterally. We could then rightly expect considerable progress towards disarmament, the pattern following the well-known mutual chain-reaction pattern. Most countries must be eager to follow suit, but it is the two superpowers who are accountable for the course events are taking.

Under the assumption that they should become willing to lead, and not resist, international disarmament, I have set out suggestions for a step by step agenda. Here I wish only to mention that it would culminate in an agreement on a "minimum deterrent," leaving some, but few and well controlled, nuclear weapons in the hands of the great powers. This is argued on two points: one, that the United Nations should not, in my view, be the trustee of these weapons, and, second, that as the fruit of the tree of knowledge has become available to man, it would be a wanton idea to recreate the state of innocence.

But even if the assumption would not come true that the superpowers would be willing to cooperate, in an urgently indicated future, I have also a long list of measures which the lesser nations could undertake on their own responsibility. Such bypassing of the superpowers is not desirable but it may become necessary as spurs to more positive cooperation. That list for more vigilant action by lesser nations includes, for example, comprehensive ban on chemical weapons, making the major part of the world proudly free from responsibility for its self-poisoning. It also recommends a virtually immediate establishment of an International Verification Agency, to begin with on an interim basis. Many more independent actions and studies, for moving disarmament matters forward, can be taken on the basis of majority decisions in the United Nations.

I have thus stressed the responsibilities of the lesser states to take independent action in the present deadlock in disarmament. But I cannot believe that the superpowers will for long be as negativistic as hitherto. And I end my book by expressing a great trust in the peoples also of these two countries, and a fervent hope that their leaders will come to choose a strategy of peace, of reason, of truth.

Such a strategy of truth means in the final instance facing the arms race as the major intellectual and moral dilemma of our time. Having been created solely by man, it lies in our power to solve it.

Senator SYMINGTON. Thank you, Madam Ambassador.

This is Senator Case, the ranking Republican member of our committee. I have the greatest respect for him, especially since he is as interested in this subject as am I. He will be here next year and can pursue it further.

In looking at your statement several thoughts have occurred to me and I have some questions I wish to ask you before yielding to my colleague.

MORE PUBLIC KNOWLEDGE OF PROBLEM SUGGESTED

You mentioned the IAEA and the Non-Proliferation Treaty. A member of the staff of the Armed Services Committee and my staff and a member of the Foreign Relations Committee—both of whom are in this room today—and a member of the Joint Atomic Energy Committee, we all went to Vienna to look over the IAEA a year ago last July. We concluded without reservation that it was largely form as against substance when it came to the application of my penalties.

Also, I am sure you know this much better than I do, after a country joins and receives all of the information, it can resign within 90 days formally, based on the charter. So, we were very disappointed in what we found there.

You mentioned the apprehension of the countries of Europe. One of the most prominent members of one of those countries said to me that it may be a limited strategic war in the minds of the superpowers, but how do we explain this limitation to the millions of people who would be killed as a result of such a war in Europe.

You mention in another place "how much is enough?" In a book by Brian Crozier on deGaulle, it is written that when President Eisenhower asked him in 1959 how do you ever expect to equal the nuclear power of the Soviet Union—you know you never could—the answer of deGaulle, in quotations in the book, was "In the megaton era you don't have to equal anybody. All you have to have is enough."

Now as we watch this steady proliferation of means to make nuclear weapons, as I read your statement and as I read the galley proofs of your book, the only possibility of changing the trend, you might say, is publicity to all of the people of the world. They should have knowledge, knowledge of the problem and force at hand.

Dr. Ikle of the Arms Control Agency recently put out a pamphlet which carried an interesting statistic. It was interesting to me because I was in the worst raid that London ever had and the worst raid that Birmingham ever had. Both cities were seriously hurt. Only one-quarter ton bombs were used. According to Dr. Ikle's pamphlet, the Hiroshima bomb was actually 13,000 tons and promptly killed 85,000 people; more died from radiation. The same pamphlet says that the largest one ever dropped was dropped in the Arctic by the Soviet Union and is estimated at 59 million tons.

So, what we are talking about, as you point out, is annihilation, unless something can be done to prevent it. I personally would hope that all of the publicity possible be released by all countries in order that we could avoid a catastrophe that is becoming increasingly obvious and which would be the inevitable result of a nuclear war.

May I also join you in saying that I have little, if any, faith, in any so-called limited strategic nuclear war concept.

ENCOURAGING TRUE GLOBAL PERSPECTIVE ON ARMS MATTERS

A basic theme of both your statement and your book would appear to be summed up on page 1, where you say, "What is sorely lacking today is a global perspective on the results of national decision-making," on arms matters. Your book is a significant contribution toward overcoming any such limited perspective.

How do you believe a true global perspective could be encouraged? Ambassador MYRDAL. Do you wish me to answer the question now, or do I wait for more questions?

Senator SYMINGTON. I would like you to answer it now, but I will do exactly as you prefer.

Ambassador MYRDAL. First of all, I would like to say that my book is not quite off the presses yet, but will be very soon. I have organized it in such a way that complimentary copies will be sent to all members of this subcommittee of the Foreign Relations Committee. I would hope to reach far into Congress as such. Also, complimentary copies will be sent to all U.N. delegations and to many experts, and so on. I dispose of a tremendous number of copies because I do think it is a question of getting through to the people who have influence.

DISAPPOINTMENT IN IAEA

I would like to say also in regard to the IAEA, you, Mr. Chairman, expressed some critical viewpoints, as I have done, but you have in a more succinct manner done so.

The disappointment in IAEA I think should place the guilt where it belongs. The IAEA is an organization. It is of course trying its very best on the expert level. I do believe they have suggested a national accountancy system of nuclear fuel flows within different countries as the key to progress. If they could get that across to all countries, that is much more important than any other physical control by visits by inspectors and so on. But I say they will never get that machinery complete without also the nuclear weapon powers submitting to this kind of control. Now they can easily do so because through this accountancy system they only have to say that so and so much goes to this industry and so and so much goes to military purposes, and then nobody would look into what is going into the military sector.

I do think that is the prospect of a much better plan, if the nations would subscribe to that ideal IAEA program. But, of course, IAEA has no power to influence any government; so it all depends on how strong the delegations are.

Senator SYMINGTON. If you would yield, I have worked out that the total amount of money that we contribute to the IAEA, which could be the most important single organization in the world from the standpoint of preserving civilization, is about 1 percent of the cost of a single one of our new submarines. That is the total annual contribution that we make to this problem of trying to control nuclear arms.

OTHER NATIONS' RESPONSIBILITY IN CURBING ARMS RACE

You place primary responsibility for the growing militarization of the world with the superpowers. What responsibility do you think other nations should have in curbing the steady trend toward greater armaments?

Ambassador MYRDAL. That is a very important subject. It so happens that the superpowers have the most to spare of military equipment, and they are starting to sell it in greater quantities and with less restraint as to sophisticated weapons to the Third World. They have some military interests which will justify in their own eyes this trade. Together with that the superpowers, as some other advanced countries,

have an economic interest in pressing for trade. Of course, the arms-for-oil deal has become a new pattern which is very, very dangerous. It shows to me, and to many, that the profit motive, so to speak, takes over the idealistic motive of trying to keep down the arms race in the world.

Next to these two superpowers are France and Britain, who are selling in huge quantities. France has the sheer profit motive. Well, I cannot say too much about a foreign country and I will let that suffice. Then the lesser countries are coming up. They have not so much to sell. They have no military interest in the whole affair, and I think they could also be asked to be accountable to their own people. The choice should be openly made between what might be gained by selling arms—for example, in Sweden a small profit from the sales of about \$100 million which is “peanuts” in international trade, plus some advantages of exploiting longer production series of some military—as against the possibility to make conversion plans and be ready to show the trade unionists, show the industrialists, and so on that there are gains to be made in another way. It will take a transition period, but only a very short one. The changes and shifts in employment and in profit will not be greater at all than the shifts that are occurring every year in the normal course of industrial development and business cycles and so on.

CONVINCING THIRD WORLD COUNTRIES NOT TO ACQUIRE WEAPONRY

Senator SYMINGTON. May I ask you this question, please? How can Third World recipients of arms be convinced not to use their resources to acquire weaponry that many believe is excessive?

Ambassador MYRDAL. As I said in my statement—or perhaps I skipped over this point—the example is given by the powerful, great nations, as to the seeming need of this military equipment. Justification for the question, of course, is to them justification of why should we be discriminated against. They have carried that argument to the United Nations. The question has come up several times by Malta, by Denmark, and once by the United States that there should be an international curb of the arms trade. The poorer countries are resisting it more than anybody else because they say that is discrimination. You can produce them and we can't. You are rich enough to buy them when you need them and we are not. Should we not have the same means of defense? This is a very tricky question which I think points out the moral necessity of trying to get people everywhere to understand that their security and their welfare is not served predominantly by the military.

LENGTH OF AMBASSADOR MYRDAL'S TIME AT U.N.

Senator SYMINGTON. How many years were you at the United Nations working on this subject?

Ambassador MYRDAL. For 12 years I was working on the Swedish Disarmament Delegation, and for the last 7 years as a Cabinet Minister. Then also I have been at the United Nations as a Delegate for many earlier years.

SALT AS INSTITUTIONALIZATION OF ARMS RACE

Senator SYMINGTON. In your statement you state that the Soviet Union and the United States are continuing to build up their arsenals. Also you state that SALT is "nothing but an institutionalization of the arms race."

May I say that based on my membership on this committee, on the Armed Services Committee and on the Joint Atomic Energy Committee I am inclined to agree with that statement. It seems to me at this time, say from the standpoint of any meaningful progress, the SALT talks are dead.

REASONABLE REDUCTION GOALS

You propose, and I quote, "a very considerable freeze and reductions" in the arsenals of the United States and the Soviet Union. What levels would you consider reasonable goals?

Ambassador MYRDAL. Let me say first that I was very glad to hear about the existing agreement about the responsibility of the leading powers to institute a freeze and to try to visualize that SALT is tying the delegates rather much because SALT would make it more difficult to reduce the numbers of arms. Only such a freeze is now what could be expected. But then, to become really instrumental in the arms race, the freeze must now be turned to also a freezing of the qualitative improvements. That is also the most difficult thing to work because here it is not only the military-industrial complex that is involved, but also the academic world is highly involved and has an interest in developing newer and more sophisticated weapons, and so on.

As to the question of numbers, I think I have really replied to that. I do not think that the numbers, particularly numbers of missiles, are very important. The world, we all could live with—as McGeorge Bundy said, one bomb would be enough, just one superbomb would be enough for deterrence; 400 was the figure most often used when I started to become a member of the disarmament group, and now it is 2,400 missiles. I don't think the numbers are really as important as are the newer developments. The United States is having a performance edge on all of the newer weapons. We are now, the world is now, the two superpowers are now at where it would seem to be enough. I do think a freeze aiming at qualitative further improvements, at newer generations of weapons, is the key to the whole problem of the arms race.

Senator SYMINGTON. I want to ask just one more question and then I will yield to Senator Case. He has to leave at 11 o'clock.

RESULTS TO DATE OF NUCLEAR SUPPLIERS CONFERENCE

How willing do you believe other nuclear states—for example, France, Germany, China—would be to cooperate in efforts to deal with the growing world danger incident to this nuclear proliferation? We all know of the nuclear reprocessing sale by Germany to Brazil and of the French efforts to that end with Pakistan and South Korea. The only meaningful effort, as I see it, that has been made, is the so-called Nuclear Supplier Conferences held in London. I was interested by the rumors spread around that it was all in secret because one of the mem-

bers, the Soviet Union, was anxious to keep it secret. I found out that that was not true at all, but that it was another country that was anxious to have it all done secretly. Again, let me emphasize that the prime purpose I had in inviting you here, especially after reading the galley proofs of your book, was your belief and mine that we can eliminate the secrecy as much as possible. The people of the world, who are going to be the ones to suffer, should know about this new force that the Almighty has given the peoples of the world.

My question is what is your frank assessment of the results to date of the so-called Nuclear Suppliers Conference being held periodically in London?

Ambassador MYRDAL. My frank view is that of course it is a step forward in one sense; that if there could be an agreement on holding back and requiring more stringent safeguards in all of the sales, that would be very valuable. But no such agreement by the suppliers themselves could ever hold. That is not enough to control the world when you have the spread of plutonium to some 30 countries at least, when a great number of prospective nuclear powers are growing up. They cannot be held back. Some of them have sources of fissile material of their own—Brazil and India, for example. So that is not enough.

The next step which has been advanced at the NPT conference, and also I think perhaps by the suppliers group, is that one should internationalize the reprocessing plants. But then that should be true internationalization. That would mean not under U.S. leadership, or not even under bipolar United States-Soviet leadership. But it should be truly open and the plants should be placed in some more neutral country. Now I am not advocating Sweden. We are going through a process where we are turning away from nuclear energy more and more. But internationalizing reprocessing plants is a second best step. But even that is not enough. There must be some real restraints taken voluntarily by the greatest powers, not only to open their secrets, but to submit to controls.

As I said before, I hope that there could be a worldwide, let's say, an international, a United Nations, discussion, both on the prospective real needs of electrical energy, and then on the safeguards, particularly on plutonium and the safety of placing the spent fuel elements somewhere and all of that should really be taken up at some new international conference. I would call it a nuclear energy conference, but it should aim at constraining this spread. Then there would be many good inputs from many countries, particularly from many in this country where you have most of the experts and the most open discussions in your Congress.

Senator SYMINGTON. Thank you.

Senator CASE.

Senator CASE. Thank you, Mr. Chairman.

COMMENDATION OF AMBASSADOR MYRDAL

I want to thank you for having this meeting of our subcommittee today during our recess. It gives us both a chance to greet our witness again and to express our appreciation for her many-sided contribution to a better society and a better world.

We wish her great success in the production of her book. If she happens to make a little money out of it in addition to doing good, this will make us happy too. The main contribution is its content.

I shall not pretend to have been able to digest your statement by just hearing it today. I wish I had been able to see it before. I suspect it is going to be, as all things have to be if they really have any kind of solid basis, more of a stimulus than a plan for the perfect world.

In that connection I am reminded that only a few months ago I read with avidity, as we all do, an eager statement by someone who had a plan. The plan was that every country should let its people hear everything from outside so that the people of each country could be the force to bring the world together. That is a little bit like Don Marquis in one of his parables. I believe it was the town cockroach and some other bug that were involved. There was a famine in the town and the cockroach said to his friend, "What shall I do?" He replied, "Well, just go out into the country and change yourself into another kind of insect and eat the grain." "Well, how do I do that?" "Oh, don't worry about how to do that. That is not for us philosophers. That is for so-called practical people to handle."

This is what we are all doing—yearning for a way and suspecting that what we are going to do is do it step by step.

In your own country you had recently an interesting controversy between the environmentalists and the practical people. These exist all over the world. Our country is the same. I think our chief hope is for people like you talking to people who have an open mind and a great desire to hear your message and keeping it up. I hope that you will.

Welcome again to this country, which is almost, I am sure, a second home to you.

First I wanted to say that. Now I would like to say this.

COMMENDATION OF SENATOR SYMINGTON

This in a way may be the swan song of our chairman in his activity as a most useful member of the Senate. I am sure it won't be his swan song from public life in the United States, but merely a change in the nature of his service. For me, personally, the association which I have had with him has been one of the great satisfactions not only of my service in the Senate, but also of my whole life. I wanted very much to be here for that reason today, also, Mr. Chairman. Please don't leave us entirely because we need you very much.

Senator SYMINGTON. Well, now, bless you for your remarks. I feel exactly the way Senator Mansfield does. He and I came to the Senate the very same day. He said, "There is a time to stay and a time to go."

I always will be interested in this subject. I know Senator Case has another engagement. So I would like to submit further questions to you to be answered for the published record.

UTILIZING NUCLEAR ENERGY TO MAKE ELECTRICITY

But there is one other question which I would like to now ask and I know Senator Case is as interested in it as I am. That is, what are your thoughts about utilizing nuclear energy in order to make elec-

tricity? I ask that because it is estimated that 8 percent of electricity here today is being produced by nuclear power. In the early 1980's and the middle 1980's that will rise at the most to 20 percent. There are many people who think it should be abolished.

I was very impressed with the statement made shortly before his leaving the Joint Committee by Chairman Pastore, who is somewhat of an expert also, as I hope Senator Case and I are because of our interest in this field. He said there has never been a single death at any plant in any case where we have used nuclear power on a peaceful basis to produce electric energy—not one death. We know of the hundreds of people who have been killed in the oil business and the thousands in the coal business. Yet there seems a determined effort on the part of some to, you might say, deny this force on any basis from being used for the production of energy.

I wonder if you would be good enough to give us your thoughts about that.

Ambassador MYRDAL. May I be allowed first to give one answer to Senator Case? This is both half jokingly, yet rather seriously. He said he hoped I would make some money. I do not particularly wish to make money. I hope the book will sell very well, but I will use all of the profits from my book to gain influence for my ideas. That is the main thing. Books may be all right, some of them. Spreading knowledge to people is tremendously important and pamphlets cannot do that and reach the people. The most potent of the mass media is, of course, film and television, and they do not work for disarmament. Their influence is not so much direct as indirect and subliminal, and it is for violence and for war and for all of the forces which the disarmers are against. How to get at them I do not know, and my incomes would certainly not suffice.

To answer the chairman's question, and that is a very serious one, to what degree nuclear energy should be used and to what degree nations should be dependent upon nuclear energy for electricity. I think this raises the problem of the whole energy policy for each country. That in turn raises the question of which countries do not have alternative sources of energy. There are some countries of the Third World who simply would not have anything. We in my country have rivers that deliver a lot of hydroelectricity. Our question is whether we should import oil or develop nuclear energy. So these problems are different in all of the countries.

Our first reply is we should first of all try to stem the consumption, at least freeze the consumption at present levels. This fact, that the situation is so different in different countries, makes one more argument for the reply I gave a little bit earlier. I do think we are ripe for a worldwide, international comparison of notes and looking into the prospects of the various countries. Also from that point we will see where some countries are ready to export to power-hungry, that is electricity-hungry, nations energy in some other form. I think there must be a kind of pooling of experience. It is just that this time there are so many doubts raised in this country and in other countries about the environmental effects that a pause of some years, a moratorium we like to say in the disarmament clan, should be utilized to make that kind of worldwide examination.

The problem could never be solved in one country by itself.

Let me add one more word. Nobody speaks about the needs of the future generation. What resources are we saving for them, to be exploited by them at their choice when they grow up? I think that is one reason for holding back development presently, without giving a final verdict regarding where we should go in regard to nuclear energy.

Senator SYMINGTON. May I thank you very much.

We have more questions which we would like to submit to you for the record. You were very kind to come this morning and give us the benefit of your thinking.

I might add that I am very glad that Senator Case was here because on both sides of the aisle, no Senator is more respected than is he. He has long been interested in this subject and has served on various subcommittees as well as the full committee. I am confident that in him you will have a most interested observer of these magnificent thoughts that you have from the standpoint of the future of civilization incident to the development of nuclear power.

I do thank you very much for being with us this morning.

Senator CASE. Thank you, Madam Ambassador.

Senator SYMINGTON. It was a pleasure to have you.

This subcommittee is adjourned.

[Whereupon, at 11:05 a.m., the subcommittee adjourned, subject to the call of the Chair.]

[Ambassador Myrdal's responses to additional questions for the record follow:]

Question 1. How valid do you believe concern that substantial reductions in strategic weapons might lead to destabilization: for example, if a break-through was made in submarine detection?

Answer. A break-through in submarine detection, if onesided, would undoubtedly have grossly destabilizing effects on the military bipolar set-up, whether there were substantial reductions or not in strategic weapons. Such a break-through ought to be avoided or, if occurring, be openly shared with the other side.

Submarines with their SLBM's carry, because of their considerably high invulnerability, important deterrence value. Such deterrence must, in order to be stabilized, be effective from and against both sides, although not necessarily in regard to numbers or detailed characteristics. Openness is the best protection for deterrence as I have analyzed in Ch. X of my book. And it is deterrence, not warfighting capabilities, which is of dominant concern to the whole world.

Question 2. Do you believe a really meaningful SALT agreement would encourage other nations not to seek nuclear weapons; and if so, why?

Answer. An adequate answer would depend on what is to be understood by the term "a really meaningful SALT agreement". A simplified first comment would make a major distinction as to whether freezes or reductions were referring to quantities only or also to qualities of the nuclear weapons in the arsenals of the superpowers.

If, as has been the path chosen hitherto, SALT agreements would be concerned mainly, or practically exclusively, with quantities of nuclear weapons, predominantly their delivery vehicles, their missiles and to some extent their warheads, with the tremendous overkill remaining, other nations could hardly thereby be discouraged from seeking some nuclear weapon capabilities for themselves.

If, on the other hand, "really meaningful" agreements would mean stopping the competition for improvements of the qualitative characteristics of nuclear weapons and delivery systems, a history-marking king progress towards disarmament would be signalled. It would entail practically the first really meaningful renunciation (after the one on biological weapons). Such a qualitative freeze would amount to that stop of "vertical proliferation", which has been demanded by the non-nuclear-weapon powers as a counterpart to a stop of "horizontal proliferation." It would no doubt have a tremendous impact on disarmament negotiations. The signal most urgently called for is an underground test ban."

An agreement between the superpowers to cease their mutual competition for ever more sophisticated weapons would be judged to be a major fulfilment in real terms of their promise, and obligation, to halt the arms race. Thus, the non-nuclear-weapon powers would be deprived of any justification which they can at present claim for seeking lines of action for themselves as the weaker ones, which are deemed to be right for the stronger ones.

It is often asserted that one reason for more countries to seek nuclear weapons is to partake of their "prestige". I hold that the superpowers are not sufficiently aware of the resentment against power as such, more often than not appearing as an arrogance of power. It is still regrettably true, as Thucydides once said in an old-time political conflict that "you and we should say what we really think . . . for we both alike know that . . . the powerful exact what they can, and the weak grant what they must."

Question 3. In your discussion of nuclear weapons in Europe you observe that Europeans fear a "limited war" by the superpowers might be no less than a war of annihilation for Europe; and we happen to know that is true. Do you believe the two superpowers should agree to withdraw all nuclear weapons from the European theater; and if so, how would that affect the threat of nuclear war in Europe?

Answer. There are two parts to this question which I wish to treat separately, as the first one requires a reasoning in stages while the latter can be given a more unequivocal reply.

I definitely believe that as a first step the two superpowers should withdraw all nuclear weapons from the territories of their allies on the European continent. This would be a taller order for the United States, not only because their numbers of such weapons are greater but also because there is doubt that the USSR has nuclear warheads, as distinct from delivery systems, deployed in the territories of their allies. It would in a corresponding degree be of greater value to the NATO allies, as the nuclear weapons deployed in their territories offer more tempting targets for a Soviet preemptive attack than would be the case for the East European allies.

The next step is more difficult to foresee, due to the difference in geographical propinquity to a European battlefield. Whether Western nuclear weapons should also be withdrawn from rear positions, chiefly in Britain, could be made contingent upon USSR willingness to make some corresponding moves. Nearest at hand would seem to be removals from the Kola Peninsula, not only of the short range weapons like FRUG, but to my mind also the Slateboard SRBM's should be withdrawn as they are threatening the NATO member Norway and indirectly also neutral Sweden. This despite the fact that they are claimed by the Soviet Union to be strategic arms as they are targetable also for longer range attacks. The European countries, including the neutral ones would have a genuine interest in negotiations, resulting in a maximum elimination of all so-called tactical nuclear weapons from their lands. Their concern about "defense of Europe" would, as far as it refers to the NATO side, be reassured by SLBM's, targetable as they are on any point threatening to be used for waging war against, or in, Europe. Their chief asset is their so much greater invulnerability than any of the weapons now deployed inside Europe, ostensibly for the "defense" of that continent.

The answer to the final part of the question must be clearcut: nobody has perceived any threat of a nuclear war, or any major war at all, from any European country itself. The two superpowers should reach agreement to settle their bipolar conflicts elsewhere. Thus the threat of nuclear war "in Europe" would be made to disappear. (Footnote: SIPRI is just about to publish a volume on *Tactical Nuclear Weapons in Europe*, with particularly interesting contributions by J. I. Coffey, American, J. K. Miettinen, Finnish, and Olga Sukovic, Yugoslavian.)

Question 4. On page 11 you suggest that a significant step toward curbing nuclear proliferation would be a pledge by the nuclear powers never to attack non-nuclear states with nuclear weapons. Assuming this pledge were made, what steps would you expect other nations to take in response?

Answer. I would, and quite confidently, expect the non-nuclear-weapon States who would be the beneficiaries of such a pledge to take on, in their turn, the same responsibility. Their pledges, not to attack non-nuclear-weapon countries, given in solemn form and duly ratified according to their national constitutional procedures, should serve to reassure their neighbors, as it would imply a confirmation of their intention not to acquire nuclear weapons.

Such pledges, given by a number of nations and thus achieving a mutual and multilateral character, would contribute to the creation of nuclear-weapon-free zones, thus a very valuable step in the direction of increased national security

and international disarmament. That larger issue—the establishment of nuclear-weapon-free zones—to my mind requires just a pledge of non-attack by nuclear weapons by the States who possess those weapons. This has been positively illustrated in the acceptance of Protocol II to the Tlatelolco Treaty, establishing a nuclear-weapon-free zone in Latin America. Four nuclear-weapon-powers, including the United States, have come forward with just the pledge as here described.

In addition, should such a pledge be forthcoming more generally it could be valuable in extracting from non-nuclear-weapon States a wider adherence to NPT and a greater willingness fully to submit to IAEA safeguards.

Question 5(a). On page 9, referring to the May 1975 Review Conference on the Non-Proliferation Treaty, you say, "the two nuclear powers, evidently in collusion, just stonewalled any attempts to bring the Non-Proliferation Treaty provisions more in line with general international ideas." From the standpoint of world peace, this is a serious charge. What "attempts" do you believe were "stonewalled"?

Answer. Every attempt to improve the NPT provisions, to secure their more effective implementation by the superpowers and to obtain from them concrete indications as to the promised cessation of the arms race. No attempt was made to use the Review Conference as an "opportunity to strengthen the Treaty" as was the mandate, widely supported during the preparatory stage. (See statements by the Secret General, CCD delegates and member State delegations at the United Nations Assembly from 1970 to 1974, United Nations, *United Nations and Disarmament 1970-1975*, New York 1976, pp. 75-82.)

I make the charge of superpower "stonewalling" on the clear evidence that no steps forward were suggested or even supported by them. The accusation has a graver tone than usually, because these negative tactics were obviously agreed upon by the three NPT nuclear-weapon powers at a meeting in London prior to the Review Conference. (Details are related in my book.)

Looking at the records of the NPT Review Conference one will find both sins of omission and of commission on the part of the superpowers. An important "sin of omission" was the absence of any offer to widen the IAEA safeguards so as to cover also installations in their own countries as promised earlier during the negotiations on NPT. I count it as a sin of omission although any such pertinent suggestion was not formally presented by any other participant; if I had been the Swedish delegate I should certainly have presented an amendment to that effect (see further under b) below). A much more fundamental sin of omission was, of course, the failure to offer any firm commitment to definite steps in fulfilment of the obligations under Art. VI of the NPT.

My charge of "sins of commission" refers to the general unwillingness on part of the three nuclear-weapon NPT members to cooperate in a positive way and specifically their refusal to allow votes and prescribe a consensus rule thereby nullifying draft resolutions proposed by a great number of legitimate NPT partners. I wish to refer particularly to resolution a) (*op. cit.* p. 84), concerning a draft additional protocol with certain rules for the time-limited suspension of underground nuclear-weapon tests. Also to resolution c) (*ibid.*) concerning the non-attack pledge, repeatedly referred to in these answers. On the other hand I must clarify that I would not have gone along with some other draft resolutions, tying the implementation of NPT to extraneous demands, as e.g. related to SALT.

Question 5(b). What changes do you think should be made in the Non-Proliferation Treaty?

Answer. In order not to go beyond suggestions explicitly made in my book I wish to confine my remarks to the request for "IAEA Safeguards on All Nuclear Facilities in All Countries". An amendment, constituting only a slight revision in Article III of the NPT, would substitute "all States" for "non-nuclear-weapon States". This change in the rules on safeguards would rectify a glaring inequality in the NPT.

In practice, this would not be an insupportable burden on nuclear-weapon States, as the application of IAEA safeguards is now being considerably simplified. Great reliance is now placed on a national system of self-control and an international accountability for the flow of sensitive material to various purposes, minimizing the need for physical inspections. In the case of the nuclear-weapon States, they could in the materials accountancy system indicate what material goes to military purposes, leaving the flow to civilian installations open for the same kind of random inspections which is the rule for all countries under IAEA safeguards.

Question 6. All knowledgeable people share your concern about nuclear proliferation. Some believe we have passed the point of no return. Do you think it still possible to limit the spread of nuclear weapons; and if so, what steps would be at the top of your list of priorities? (Example: you have already mentioned a pledge of no use of nuclear weapons against non-nuclear states; what else might you have in mind?).

Answer. I am still hopeful of halting the spread of nuclear weapons to additional countries, coming from one, Sweden, that has realized that its national security is greater without such weapons. And pessimism, after all, is only appropriate for historians.

In my answer to additional question 2 above I have indicated as a priority step the discontinuance of the qualitative competition by the superpowers. And in the final paragraph of the preceding answer to additional question 5. I have recommended as practically a *sin qua non* that NPT be amended so as to cover duties to submit to IAEA safeguards by *all* countries, not only the non-nuclear-weapon States who are, after all, the more innocent ones.

Further, I have in my book made a recommendation, which also the NPT Review Conference leaned towards somewhat, namely that any re-processing plants be internationalized, in the first instance those operating plutonium extraction under the heading of the next question.)

Question 7. Considering that this steady spread around the world of nuclear technology for peaceful purposes can make it possible for many more nations to acquire nuclear weapons, should the nuclear suppliers place restrictions on any nuclear assistance; and if so, what kinds of restrictions?

Answer. All suppliers of fissile material but also of reactors and crucial component parts should form an international "pool" for all transfers. They should formally agreed to channel all request for nuclear assistance through this pool, which in turn should request submission to IAEA safeguards on all relevant imports by all countries. These problems I have examined more fully in my book, particularly in Ch. VI: Barring The Spread of Nuclear Weapons. I argue there that the restrictions should be made applicable to all importers, including the nuclear-weapon countries. On the other hand, I have argued that if the suppliers agreed to be utterly restrictive and the importers fully met the IAEA standards, the requirement of adherence to the NPT might be relinquished, at least until a time when the NPT were amended so as to become politically more acceptable by more nations, and particularly the so-called "threshold" ones.

All restrictive requirements should apply also to PNE's and become constitutive part of the overriding international agreement regarding such "peaceful nuclear explosions", foreseen in article V of NPT. The full internationalization of licensing and controlling such explosions has been urgently advocated by me and several non-aligned delegates both in the CCD and the United Nations Assembly. The NPT Review Conference did nothing to satisfy these demands.

APPENDIX

THE SALT II CEILINGS, AND WHY THEY ARE SO HIGH

(By Milton Leitenberg, Cornell University, February 1975)

Several articles and editorials have already appeared presenting the argument that the "ceilings" on strategic nuclear weapon systems, and within these on "MIRVs," that were agreed upon at Vladivostok are too high. But none of these articles have even raised the question, no less attempted to answer it, as to why they are so high. Why were such high "ceilings" agreed to, and not lower ones.

THE U.S.S.R.

The well known Soviet tradition of never saying anything about its own R&D, procurement or deployment of strategic weapon systems has fed the strategic arms "race" by permitting, without contention, an official and semi-official presentation in the U.S. which rarely reflected the actual state of relative development and deployment of strategic nuclear weapons on the two sides. U.S. presentations have consistently been used to justify subsequently U.S. deployments. Announcements in the U.S. on Soviet weapon development come from sources with very strong biases, either as moves in administration or military efforts to gain further authorization and procurement funds for U.S. strategic weaponry, from strongly anti-Soviet congressional members, or at the least, set within a particular perception of Soviet strategic weapon policies. For example, none of the U.S. announcements on new Soviet missiles, MRV or MIRV testing, new submarines, or the "Backfire" bomber have ever been denied, commented on, or even recognized, by a Soviet spokesman. There has never been a single claim that any correction was necessary. Yet there have been several gross misreadings of Soviet strategic weapon developments in the U.S. during SALT (often by one or more of the competing factions in the internal U.S. administration debate on SALT policy), such as:

The SS-9 construction "pause." Though the statement was frequent that the Soviets were building large missiles at a rate of 50 a year, it turned out that only 25 were built between August 1969 and February 1972;

The confusion of Soviet MRV tests (in 1969) and MIRV test (the first Soviet MIRV test occurred in June 1973);

The functions of the Tallinn air defense and radar system; and

The "giant" new silos that were trumpeted as heralding a new super-sized Soviet-missile, which were hardened and duly filled with existing types of Soviet missiles.

In addition, in several past instances, Soviet silence rebounded to the very great disadvantage of the USSR through the subsequent U.S. deployments of strategic weapon systems when it would have been rather simple for the USSR to demonstrate—had it cared to—that the case under which these U.S. deployments were publicly rationalized simply wasn't so. However, in these cases the USSR chose to maintain a pretense for other ostensible benefits on the international political level.

In November 1974, under the pressure of accusations in the U.S. that the Soviets were building new ICBM silos that were not permitted under the SALT-I agreement, and that they were keeping new submarine construction and some other missile developments under cover so as to obstruct satellite reconnaissance, [1, 2] official Soviet spokesmen formally denied several of these accusations. [3-5] These are perhaps the first, few, public instances of such specific Soviet denials. The reason for this having taken place now very likely is that because of some of the provisions of the SALT-I agreements, statements of the sort made in the past that the Soviets were deploying this or that weapon system now become in addi-

tion accusations of breaches in the SALT agreements, and from this in turn, charges against Soviet good will under "detente."

However, none of this can be taken as meaning that the Soviets were now interested in negotiating a halt to the strategic arms competition between themselves and the U.S. In the SALT-II negotiations since May 1972 that led up to Vladivostok the USSR had consistently pressed for a broad swath of limitations and reductions of existing U.S. programs. These demands included a halt in the U.S. Trident submarine program, the B-1 bomber program, inclusion of U.S. nuclear strike aircraft in Europe and on carriers (the "Forward Based Systems"), calculation of missile submarine deployment times, limitation of overseas U.S. bases for such submarines, and even the inclusion of French, British (and Chinese) nuclear forces as part of the "U.S." side's numbers. There may be nothing essentially unreasonable in these demands (except a small part of the last), except that the Soviets never placed them in a context that meant negotiating.

The USSR just as consistently never gave the slightest indication of any concessions or quid pro quo's whatsoever on its part that might even force the issue of consideration of these demands, or proposals, within the U.S. government. What if it had offered not to deploy MIRVs—presumably something the U.S. would have much desired—or not to deploy them in its largest ICBM missiles, or to deploy them only in low numbers? As it was, the Soviet demands were never considered seriously and were rejected out of hand by the U.S. A U.S. administration seriously interested in reductions might have countered with an equally drastic list of demands for Soviet reductions and halts. But for the United States this was simply out of the question, even as a gesture or as a tactic, no less as an effort to establish serious bargaining on reductions. For example, despite mountains of rhetoric by the Nixon administration, the U.S. Trident submarine system was never a "bargaining chip." No one in the U.S. wanted to "bargain" it away. Neither side was interested in any reductions of its own ongoing strategic weapon programs or even of any that had been planned.

What the phrase "neither side" really translates into is that neither in the U.S.A. nor the USSR did the executive (the office of the President, or the Central Committee) attempt to get agreement from its military chiefs to such reductions, or that it politically feared, or failed to get such reductions. Soviet political leaders obviously decided on and maintained a program of broad military buildup since the removal of Khrushchev, especially in the area of strategic nuclear weapons. This was in response to the very large U.S. superiority at the time, and it is very likely that the form of the resolution of the Cuban missile crisis had a good deal to do with this outcome. The USSR scrapped its reliance on something like a "minimum deterrent", and went for the American way. Prominent segments of the Soviet military leadership have opposed limitations on Soviet weapons programs via SALT by articles in the Soviet military press on and off for the past half dozen years. In the six months before Vladivostok, the Soviet party leadership had apparently been able to negotiate within its own councils the removal of the numerous demands for which it either had nothing to offer in return or nothing it cared to offer. The party leadership apparently was willing to argue that much in internal Soviet debate, but not more, and the Soviet military got the high numbers for missile and for MIRV ceilings.

Even on the relatively amorphous untechnical decision on the duration of the forthcoming SALT-II treaty, when Mr. Brezhnev indicated back in June 1974 that he could not agree to more than ten years, the reason offered was that his military wouldn't let him. In effect then, both sides took out all those demands that would cause their own force to be substantially cut in order to obtain the demand. Quid pro quos are only "required" (not in any absolute sense) for program curtailments, or cuts. This left all those programs for which no quid pro quo is necessary: that is, all the programs that would not be curtailed, and the result is that both sides go ahead with their respective buildups. It is now reported that in the closing months of the Nixon administration Soviet officials reportedly offered to accept a 1980 (not 1985) ceiling of 1,100 American MIRVed missiles to 1,000 Soviet ones.[6] Yet it is reported that when Secretary Brezhnev arrived in Vladivostok he came proposing numbers for the ceilings that were even higher than those being proposed by the U.S.: "over 2,500" for total delivery vehicles and "over 1,300" for those that could be MIRVed, vs. "2,000" and "1,000" proposed by the U.S.[7] However, Mr. Kissinger has admitted that the compromise figure of 1,320 missiles for which MIRVs would be permitted was a United States suggestion, and the number can rather easily be fitted closely to U.S. plans for

MIRVing various of its missiles, some existing, and some, such as Trident, to be built. Thus even in this instance the effort was not to limit or reduce the Soviet MIRV capability, of which so much official U.S. fear had been expressed, but to suit U.S. weapon program "requirements".

A rather troubling report on Soviet negotiating behavior at the SALT negotiations recently appeared. The reports are by Paul Nitze, a member of the U.S. SALT delegation from 1969 to 1974.[9, 10] They document in unpleasant detail Soviet efforts down to the monitoring of conversations within the U.S. quarters and other efforts which hardly seem to have any place in an enterprise that will set the framework of military confrontation between the U.S. and USSR for the coming 50 years and that will set the models of advanced military technology for other nuclear and non-nuclear nations for an equally long period.

Soviet Marshall Viktor Kulikov has also taken up the theme again in the pages of Pravda "that nuclear war could be an instrument of politics", [11] thus mirroring the opinions of the U.S. Secretary of Defense and the U.S. Joint Chiefs of Staff. This position is traditionally aligned with a detailed concern for the niceties and margins of nuclear superiority, a constant concern with "nuclear blackmail", and the procurement of accompanying nuclear weapon systems with "war-fighting" capability. It means preparation for confrontation, not for accommodation, both on the issues of the SALT talks themselves, as well as on other international issues. There had been a running debate on this issue in 1973 and 1974 in the pages of Pravda with military spokesmen representing the above position, and political assistants of Sec. Brezhnev taking the opposite view. It would appear that the military view has prevailed. A short article in Krasnaya Zvezda after Vladivostok also expressed Soviet military dissatisfaction that foreign military bases (i.e. the U.S. "forward based" strike systems in Europe) were not covered by the accord,[12] but there were suspicions that this may have been intended to serve as much as an aid to Messrs. Ford and Kissinger with the problems they were going to have in the U.S. to get the agreements and their "ceilings" accepted.

American press response to the high ceilings was mixed, but it was the more important press that supplied the negative component, and an official Soviet reply to western criticism that the agreements did not go far enough was quick to come:

"The phony arguments of those unhappy about the Vladivostok meeting are false and flippant. . . . It is clear to anyone that the Vladivostok summit reached the maximum of what is possible under the current conditions, and to reject this new and substantial step forward, under the pretext of its being allegedly not big enough, means to lapse into demagoguery and try to hurl back Soviet-American relations and the entire process of international detente to the times of tension and cold war." [13]

Opposition to the ceilings was called "the crowing of the overt and covert opponents of detente". [13] It is worth pointing out that the major press and editorial response in the U.S. that has been widely and unusually critical of the Vladivostok "ceilings" are not the supporters of Sen. Jackson or Buckley (the critics that can be assumed to be opponents of detente). [14] Further, how can it be "clear to anyone"—least of all any Soviet citizen—if not even the numbers of the "ceilings", 2,400 delivery systems on each side and 1,320 of them to be MIRVed, had been published in the U.S.S.R. at the time of the Izvestia article (and there is no report that they have appeared subsequently). Nor is there any explanation of why it is the "maximum of what is possible under the present conditions" (i.e. the opposition of the Soviet military). It is not even clear if the word "MIRV" has ever been explained to the Soviet public. (A general phrase such as "most modern means of warfare" is generally used in the Soviet public press to refer to all missiles, rockets, submarines, etc.) The Soviet reader doesn't have the vaguest idea of what is involved, of what is at stake, of the relations of their own Soviet strategic weapon programs and developments and those of the U.S. to the ongoing SALT negotiations. [16] (The Izvestia article even took the chance to claim "that (U.S.) Secretary of Defense J. Schlesinger, too, is highly satisfied with the agreement reached between the U.S.S.R. and the U.S.A. on the further limitation of strategic offensive arms".

Since everyone in the West knew that Sec. of Defense Schlesinger had consistently opposed the high ceilings for two years, and finally acquiesced only when completely isolated in the U.S. policy councils, unless one wants to consider the remark a gratuitous insult, one has to assume it was intended to control any possible dissatisfactions Soviet Defense Minister Grechko still may

have harbored.) Soviet government officials were reportedly being told in official briefings that "high ceilings are better than no ceilings at all", [16] but unfortunately this doesn't tell them why Mr. Brezhnev didn't come to Vladivostok with lower ceilings and prepared to try and drive down the U.S. ceilings proposed, and why in fact he came proposing even higher "ceilings" than the Americans. One can be reasonably certain that such information will never see the light of print in the U.S.S.R. (One also wonders if any such questions occur to the Soviet officials being thus briefed, and if so whether they ask them.) Finally, the *Izvestia* claim that the accords provided for the "cessation of the arms drive" is contrary to every single fact of both Soviet and American strategic weapon development and procurement throughout the entire five year period of SALT, and is pure gibberish.

Soviet disarmament propaganda at the public level, that is, aimed at its own public and at the international public as opposed to official proposals, is often heavy on invective. Because the Soviet "disarmament" position is now especially weak in this area, and because of the Soviet push for high "ceilings" and new strategic weapon systems for themselves (and tolerance of the new systems of the U.S.), one can expect even more invective and less substance in the future from the U.S.S.R. on SALT, its numbers and their implications—rather than the prospect that the Soviets might try to dig in their heels to halt the process.

So much for the Soviet championship of "disarmament and arms control."

THE U.S.A.

In the United States the critical item is that Mr. Kissinger made no serious attempt whatsoever, over a period of five full years in which he had the time to do so, in internal negotiations within the U.S. government to get the Joint Chiefs of Staff (JCS) to agree to a MIRV ban or to low total MIRV levels. Quite the opposite, Mr. Kissinger and President Nixon were personally responsible for hastening the initiation of U.S. deployment of MIRVs by a full year and for rushing ahead the pace of their deployment. U.S. deployment was begun in June 1970, exactly three years before the first Soviet MIRV test. By the time of the Vladivostok meetings the United States already had deployed MIRVs on some 800 of its ICBM and SLBM missiles. As of January 1, 1975, the Soviets had not yet deployed any MIRVs and had not yet completed their MIRV testing programs. It is for this reason that the numerous printed comments that Mr. Kissinger had "awoke late" to the danger of MIRVs are nonsense. He had instead favored the opposite policy when he considered it to the U.S. disadvantage. The Nixon-Kissinger numbers for MIRV limits at the time of their summit trip to Moscow in June 1974 which were "low" ("around 500"), were for land based MIRVed ICBMs only, and did not include submarine launched (SLBM) MIRVed missiles. It was in the land based area that the U.S.S.R. had a lead in deployed ICBM launchers, and the U.S. had already deployed SLBM-MIRVed missiles, while the U.S.S.R. has never tested an SLBM with MIRVs at all. The Vladivostok agreements would permit the U.S.S.R. to MIRV 1,320 missiles.

The Department of Defense, so concerned over Soviet throw weights, MIRVs, etc. would rather see Soviet MIRVed missiles climb from zero to 1,320 rather than drop any U.S. MIRVs, even ones it has not yet deployed. Secretary of Defense Schlesinger had suggested lower numerical totals, apparently with some early support from the JCS. However, the JCS switched to Secretary Kissinger's position of higher numbers. The Secretary of Defense did not choose to make it a matter of his tenure to overrule the JCS, and there is no indication that he would have won President Ford's support for a position of doing so. (In the earlier part of SALT-I and-II, under Secretary of Defense Laird and President Nixon, there wasn't the slightest chance of such an occurrence.) U.S. SALT-I proposals did not contain a prohibition on ABM systems because the JCS and the DOD wanted them, and Mr. Kissinger and President Nixon agreed. Similarly, U.S. SALT I and II proposals did not contain a functional MIRV ban, again because the JCS and DOD wanted MIRVs, with even greater support of Kissinger and Nixon. MIRVing ICBM and SLBM forces was the planned U.S. five year offensive arms program. There was plenty of time to begin deployment after Soviet MIRV testing was well on its way, or after a real attempt at obtaining a MIRV ban had failed. If any U.S. administration was interested in controlling Soviet MIRVs that was the time. But it had no such interest, though a MIRV ban was pressed by the U.S. Senate. Similarly, Mr. Kissinger made no attempt whatsoever to get curtailment of follow-on systems, for example the Trident submarine program, though it was

some ten years before a replacement SLBM system was required. In fact, administration support of Trident was reportedly a quid pro quo for JCS support of the SALT-I accords and its deployment was purposefully accelerated.

Confirmation of much of this view has now been provided by someone with access to the official record, in a short paper by Lawrence Weiler, Counselor to the Arms Control and Disarmament Agency from 1969 to 1973:

"The Nixon Administration's 'MIRV ban' proposal was constructed in a manner that assured it would not be accepted. The proposal precluded the Soviets from attainment of a MIRV technology through a MIRV ban—then considered essential for U.S. assurance that no Soviet MIRVs would be deployed. Furthermore, the proposal allowed the U.S. to manufacture and stockpile MIRVs although it was not permitted to deploy them. Added to this were requirements for the on-site inspection of missiles and of ABM sites. Contrary to published accounts, the Soviets while never accepting—nor specifically rejecting—a MIRV test ban, continued to advocate a MIRV production and deployment ban during SALT I.

"Early in SALT I when the U.S. proposed abandoning efforts to achieve qualitative limitations on offensive arms, the die was cast on the nature of the offensive arms agreement that would result. While a struggle was carried on within the bureaucracy in Washington, and perhaps in Moscow, to get a serious MIRV negotiation started, it did not succeed. The existing problems were predictable consequences of that failure. Faced with a U.S. proposal that involved no restriction on any planned U.S. programs, the Soviets immediately lost interest in offensive arms limitations. In order to get the ABM Treaty, Moscow agreed to some offensive arms limitations although they made sure these limitations did not interfere with their programs.

* * * * *

"There was a brief period at the start of SALT II that might have offered an opportunity to hold new programs in check while the two sides reassessed the postponed issues on offensive limitations. The Soviets proposed a freeze on new strategic programs, directing their attention at the U.S. B-1 bomber, Trident submarine and strategic cruise missile programs. No effort was made to see if a temporary halt on new programs could have been used as a negotiating basis (by holding in check new Soviet missile programs designed to carry MIRVs) for either a MIRV ban or a serious restriction on MIRVed forces. So much for use of 'bargaining chips!'

"U.S. concern was focused on limiting the Soviet throw weight advantages for MIRVed ICBMs. To gain time, an initial U.S. suggestion was apparently made to freeze MIRV testing and deployment. Since this would have halted Soviet MIRV development during a period when the U.S. possessed an already massive MIRVed force, it was rejected.

* * * * *

"Two of the problems that made SALT II difficult are the size of existing U.S. MIRVed missile forces and the differing view of the two sides on the relative importance of missile throw weight in a counterforce capability. The Nixon and Ford Administrations have, in effect, wanted to keep U.S. MIRVed forces close to programmed levels. With the massive size of those levels, particularly in nuclear warheads or reentry vehicles, this position has made the objective of severe limitation on Soviet MIRVs almost impossible. While the U.S. focused on limitations on land-based MIRVs, the only current area of Soviet MIRV programs, the U.S.S.R. had its eyes on the 5000 MIRVs in the U.S. missile submarine force. There apparently has been no U.S. attempt to resolve asymmetries through stringent limitations on MIRVed forces involving significant reductions in U.S. MIRV numbers." [17]

Wyler adds that the agreement to permit mobile ICBMs, again something over which the U.S. Department of Defense had formerly indicated great concern "was a direct result of the MIRV levels". Not only had the Nixon administration not indicated that the U.S.S.R. had advocated a MIRV ban in SALT I, they had repeatedly stressed the opposite, that the U.S.S.R. would not accept such a ban because they were behind the U.S. on the technology. This view is repeatedly put forward in the official account, Newhouse's volume *Cold Dawn: The Story of SALT*, which derived from information provided by Mr. Kissinger's office. [18] For all the above reasons, Paul Nitze's recent attribution of the opinion that

"There is little prospect at present that the Soviet side can be persuaded to significantly curtail their planned programs (and that) The (U.S.) public, the (U.S.) military and the Congress must, therefore, be convinced that it is wise to accept Soviet nuclear superiority." [19]

As the point of view of that side of "the Washington strategic arms debate" which he opposes, is ridiculous and a travesty. Rather it is that the U.S. was always far ahead and still is far ahead in strategic nuclear weapon terms, and that from that position there has never been any serious deal offered for a mutual cutback, or any proposal that would limit Soviet strategic weapon programs at the expense of some portion of the U.S. force, either existing or planned. Back in the mid-1950's Hans Bethe wrote:

"Obviously in any negotiation each side must be willing to make concessions and to consider primarily proposals to mutual advantage rather than to superiority over the other".

Despite the most enormous amount of rhetoric exactly to this point that has accompanied the SALT negotiations, and even using these very phrases, and their enshrinement in the official statements of the 1972 SALT I accords, the principle has been consistently belied by the technical characteristics of the strategic weapon developments and deployments of both sides all through SALT, and the only agreements "to mutual advantage" have been to bilaterally legitimize the continued buildups on both sides. Editorials in the New York Times in early 1975 suggesting the desirability of real "mutual" exchanges for a slow-down are four years too late: they should have been printed in 1971, and that or earlier is when the agreement might have been had as well. [20] Similarly, calls by well informed observers that the U.S.A. and the U.S.S.R. agree to "further limitations and reductions" immediately after Vladivostock, instead of waiting to begin discussing them in 1980 or later, seem a little specious. [21] If that were really possible immediately after December 1, 1974, why shouldn't it have been possible the month before December 1, 1974? It is surely not a matter of the day. If the author had rather supplied the reasons why the "further limitations and reductions" hadn't occurred in the first place, he might have given his readers a bleaker notion of why they are very unlikely to follow, and possibly have provoked a degree of public pressure for such limitations that a false and empty optimism not only does not provide, but undercuts.

Secretary Kissinger also went out of his way after Vladivostock to introduce a good bit of further misinformation. He kept claiming that those who were dissatisfied with the high ceilings were comparing those levels to "some hypothetical model . . . some abstract model", [22] "a theoretical model. [23] giving them the representation of being ignorant of facts and technical details, or of being dreamers, or both.

"So it is not a fair comparison to compare these figures with some abstract model but only with: one, the reality of existing strategic forces, and two, what would according to the best judgment of our intelligence community, have happened in the absence of such an agreement." [22]

He kept claiming that ". . . the alternative to this agreement is an unconstrained situation . . .", which is an absolutely false statement.

"And again, I repeat, one has to compare here what would have happened without the agreement. . . when people say one should have held out for lower numbers, the operational significance of holding out for lower numbers would be a substantially increased budget for our strategic forces next year. The only way we could plausibly have achieved lower numbers is to begin building up our strategic forces dramatically in order to produce an incentive to reduce numbers on the other side. . . . It doesn't make any sense to instruct us to get better numbers without, at the same time, being prepared to pay the price of the arms buildup that will be the only possible incentive by which an agreement for lower numbers could be achieved." [22]

As for Secretary Kissinger's first contention, "the reality of existing strategic forces," his own very decisions and those of the U.S. to deploy MIRVs in June 1970 are the prime driving force in that reality—and they will continue to remain so for the next ten years, just as in the 1960-1970 period the prime driving force in "the reality of existing strategic forces" were U.S. force levels anywhere from 3 to 10 fold those of the USSR. We have also seen that an arms buildup is not "the only possible incentive by which an agreement for lower numbers could be achieved". Rather what we have seen is that it is the only possible method the U.S. government can claim so long as it refuses to reduce any of its own forces. And Secretary Kissinger is not interested in any reduction of U.S. forces. In addition, that this claim is bound to fail, as it does over and over and over again, is indicated by a former member of Sec. Kissinger's staff, and he indicates why:

"Ironically, one of Kissinger's main handicaps was a lack of effective bargaining leverage. While Trident and B-1 have sometimes been regarded as bargaining

chips, in fact these assets have been frozen out of the negotiations by the yardstick approach. Though willing to put upper limits on SLBMs and bombers as categories of systems, we have not been interested in limiting the Trident or B-1 per se. As a result, the Soviets argued that we were asking them to cut their major strategic programs via MIRV limits but were unwilling to limit our own." [24]

Thus if there is anyone using "theory", and "models", and disproven ones for that matter, it is Secretary Kissinger.

Secretary Kissinger made reference to a range of intelligence estimates, the lowest of which supposedly projected higher Soviet missile and MIRV levels in 1985 than the agreements will provide for.

"The agreement has to be compared with what would have happened in the absence of an agreement—not with a theoretical model. All our intelligence estimates indicate that in the absence of an agreement, Soviet MIRV levels would have been substantially higher than they will be under the agreement, as well as Soviet total levels, which in turn would have triggered another series of moves by us. The so-called new construction programs are the minimum planned construction programs; they would certainly have been accelerated and expanded if the Soviet Union had in fact produced at the level that our intelligence estimates thought they could. And not only could, but would. I am talking now about the middle intelligence estimate. Generally three estimates are made—low, middle and high. Both of the ceilings agreed in Vladivostok are below the low intelligence estimate, and substantially below the medium intelligence estimate." [23]

But it is exactly these estimates which are "abstract", i.e. "theoretical" and "models", by their very nature, for they are projections of the future, and there is no other way to make them. How does Secretary Kissinger know what the Soviets "would" do? And as for "could", that sounds unpleasantly like a hark-back to the "estimates", "projections" and "ranges" of the mid-fifties bomber gap, the Gaither Committee, and the end-fifties missile gap, all of which were also based on what the Soviets "could" do, and in some extreme cases wound up being 20 fold too high when the years rolled around. These estimates also sound suspiciously self-serving. No one has seen these estimates, what their assumptions and presumptions are, what strategic environment and level of U.S. forces the estimates presume the Soviet projections to be occurring in. The "ranges" and "options" of government estimates in this area are customarily extremely narrow and proscribed, and their custom-tailoring is an executive tradition. Did any of the estimates presume a cut in U.S. MIRV forces as an input to projected Soviet deployments? It's not likely. About the old accurate representation in Secretary Kissinger's portrayal of the Vladivostok SALT agreements was his indication as to how the number of 1,320 for missiles that would be permitted to be MIRVed came about.

"... the MIRV limits resulted substantially from American proposals and not from Soviet proposals. Basically, the judgment of our Defense Department was that once the MIRVs went beyond the point where, over a period of time, the land-based missiles might become vulnerable, a difference of a few hundred was not decisive. And therefore we geared the MIRV limits to a minimum program that we had established as being in the interest of our own security and made the proposed number consistent with that program." [22]

Finally, Secretary Kissinger's suggestion that both sides had to build up before they could afterwards agree to reduce weapons levels is preposterous. If anyone wants to reduce, one agrees on reducing. If anyone wants to stop at the point where one is, one agrees on stopping. If one wants to go up, one agrees to go up. This situation was summed up in two of the most cogent and incisive comments that one will see in a New York Times editorial for a long, long time to come:

"More and more the Vladivostok agreement appears to be an agreement between the military on both sides—achieved through the intermediary of the chiefs of government—to permit the buildups each desired. . . . If this is 'putting a cap on the arms race', then a shrimp can whistle—as a former Soviet leader, Nikita Khrushchev, was fond of saying." [25]

Secretary Kissinger's claim was that the agreements would halt the "cycle of self-fulfilling prophecies" which spurred on the strategic weapons race.

"Once you have achieved a ceiling on strategic forces and a ceiling on MIRVs, it is our judgment that the follow-on negotiations for reduction will be a lot easier than they will be under conditions where both sides are still increasing their forces." [22]

But Secretary Kissinger has again belied his own words. For one thing both sides will be "still increasing their forces" under the agreements, through 1985. The only difference is that the "self-fulfilling prophecies" will now be, in Weiler's phrase, "legislated", and somewhat more regularly paced, with advanced notice to the other side. That is the novel feature. They are no less "self fulfilling prophecies" for that. (Incidentally, "prophecies", since they also deal with the future, are like estimates and projections, by their very nature also abstract and theoretical.) But worse yet, Secretary Kissinger had the following to say in his Newsweek interview:

"A myth is beginning to develop that in July we made a proposal of more severe limitations on MIRVs and that this, for some curious reason, was abandoned between July and December. This simply is not true. The July proposal first of all called for a five-year agreement. If you double the number that we proposed for the five-year agreement you would have a higher number than the one we settled on for ten years". [23]

But why should anyone have doubled the number after 1980 if it was also meant as a "ceiling?" There has been no statement that the ceiling is directly related to its proposed duration? The implication is then that after 1985 that "ceiling" will be doubled? Then where and when will the reductions come in? And if one can reduce from the ten year ceiling, why couldn't one reduce from the five year one? Everyone has been under the impression that these "ceilings" are freezing points, real limits. Perhaps the negotiations in 1985 will simply be to legislate the next round of increases for the U.S. and the U.S.S.R.?

In June 1974, after Moscow, Secretary Kissinger called for a national debate on SALT in the United States. After Vladivostok Secretary Kissinger was suddenly afraid that a U.S. national debate would "upset" Moscow. It might do a good deal to make things clearer in the U.S. as well. What has been described here is typical of the entire 1969-1975 history of the SALT negotiations both SALT-I and SALT-II. In the next ten years, the projected period of the SALT-II accords, the U.S. is likely to spend between 70 and one hundred billion dollars in direct procurement of new strategic nuclear weapons systems. [26] By U.S. estimates the Soviets may spend more in the same area. These are the agreements and developments that it is suggested are "putting a cap on the arms race". This is claimed to be "control" and "limitation". Thus clearly the possible economic savings that were often claimed as a motive for both the U.S.A. and the U.S.S.R. in SALT were a pure fiction. There are no savings, and there is no halt of the strategic nuclear weapon buildup on both sides.

There are other familiar elements—for the U.S.—in the story of SALT, going back to the comprehensive test ban treaty negotiations from 1958 to 1963. Any time the U.S. Joint Chiefs of Staff have actually had the chance to freeze any American strategic weapon advantage and often a large one, they claim that the U.S.S.R. is able at that moment to overtake and surpass the U.S., (usually untrue), and opt instead for that decision which lets the U.S. buy new weapon system and pull ahead into new cycle, but simultaneously permits the Soviets to close most of the real gap in the succeeding years. There have already been several such sequences in this game of leapfrog since the end of WW II. And each time this occurs the remainder of relative U.S. advantage is less and less. Yet it is always the choice the military makes. (There was a recent press comment that the U.S. Joint Chiefs felt assured that the U.S. could achieve a first strike force 2-3 years before the U.S.S.R. That is undoubtedly correct, but what then?—What after four years had passed?) Wyler remarks that the Vladivostok "accord appears to represent a decision to let the current strategic (weapon) generations go and attempt to put a cap on following generations." [17] Any government making this claim is propagating purposeful nonsense. Never in history has a subsequent weapon system been stopped by letting the present ones go on. It was in a press conference in Moscow after SALT I that Secretary Kissinger told us that reductions were one of the goals of SALT II. [27] Where are they? Furthermore, in none of the cases in which an arms control agreement contained an explicit proviso for negotiation of a follow-on agreement with broader or more rigid controls or reductions has such an agreement ever been negotiated:

The comprehensive test ban treaty became a partial test ban treaty because the JCS and the AEC and the laboratories wanted to continue testing and to continue designing new weapons. Despite an explicit obligation to negotiate a comprehensive treaty, the partial one has just had its tenth anniversary.

The BW (biological warfare) convention was not a CBW convention (chemical and biological warfare) because the JCS wanted to retain a CW capability, and has subsequently shown little interest in "negotiating further. . . ."

The Sea Bed Treaty was not a total ban on military systems on the sea bed because the JCS and DOD want to keep the bottom mounted ASW (anti-submarine warfare) systems we have deployed in various parts of the world. There have been no "further negotiations".

Article 6 of the Non-Proliferation (NPT) Treaty, for the U.S. and the U.S.S.R. to negotiate "effective measures relating to cessation of the nuclear arms race at an early date, and to nuclear disarmament"—that is, at the very least, a halt in their strategic weapon competition—is substantively disregarded, if not rejected, in all of the SALT-I and SALT-II agreements.

Both U.S. and Soviet spokesmen have stated flatly that the Vladivostok agreement was "the best that could be achieved at this time". The above exposition explains why this is not true. Rather they achieved what they wanted to achieve. There is no linguistic way that this can be equated with "the best".

In the U.S. and in the U.S.S.R., neither the President nor the party Central Committee have been sufficiently interested, or interested at all, in taking on their respective military leadership on the question of the limits of strategic nuclear weapons development. Either they agree with the reasons their military commands want these weapons and in the numbers and kinds in which they want them, or they are afraid to contest the issue, i.e. they don't think it is significant enough to expend the political capital such an internal domestic debate on each side would require. That is called "politics", and it is the way the game is played. No one ever fights the final battle. (The reasons why anyone wants 2,400 "strategic" delivery vehicles of which 1,320 could contain perhaps ten times as many individual MIRV nuclear warheads, has not been touched on here.) Since neither side wants to give up anything it already has, usually including those programs already under development, what is "negotiated" is that level that permits both sides to have all its programs and then some.

That is why the SALT-II "ceilings" set at Vladivostok are as high as they are.

REFERENCES AND NOTES

The author is grateful to the Berghoff Foundation for support of his work.

1. Getler, M., U.S. Asks Meeting on SALT Accord. *Washington Post*, 16, 1974.
2. Robinson, C. A., Jr., Soviets Hiding Submarine Work. *Airiation Week and Space Technology*, 101, no. 19, Nov. 11, 1974, pp. 14-16.
3. Parks, M., Soviet denies silos are built against pact. *Baltimore Sun*, Nov. 16, 1974.
4. Soviet Aide Denies Arms Pact Breach. *New York Times*, Nov. 16, 1974.
5. Kosygin Complains U.S. Camouflages Some of its Missiles. *New York Times*, Nov. 15, 1974. [These are quite different from Soviet Statements at the time of their first nuclear weapons test in 1949, that the Soviet Union would only use nuclear energy "for peaceful purposes, to move mountains and rivers," etc., which are not really denials but deceptions.] Thus the denial by Gen. Vladimir Tolubko, a Deputy Soviet Defense Minister with responsibility for the strategic rocket forces states:
"Not a single silo for a ground-based launching pad has been set up since May 1972. No new intercontinental mobile systems are being made. . . . The Soviet Union in all its history has never failed to honor its commitments. Still less can it violate its commitments regarding such an important political matter as the Soviet-American interim agreement on strategic offensive arms limitation. We strictly observe the documents signed." (in *Nedelya-Izvestia*, & *Tass*, Nov. 15, 1974, quoted in 3, above).
6. New Chance for SALT. (Editorial). *New York Times*, Dec. 26, 1974; See also the very important article, ref. 24.
7. Gelb, L., How U.S. Made Ready for Talks at Vladivostok, *New York Times*, Dec. 3, 1974.
8. Mr. Kissinger's statement was made in his press conference of Dec. 7, 1974; see ref. 22. Fritchey, C., The SALT Disagreement. *Washington Post*, Dec. 11, 1974.
9. Nitze, P., How the Soviets Negotiate. *Wall Street Journal*, Jan. 24, 1975.
10. Prina, L. E. Nitze on SALT: Waht a Large Grain of Salt. *Sea power Magazine*, Jan. 1975, p. 23.

11. Zorza, V., The SALT Bargain with the Military. *Washington Post*, Dec. 12, 1974.
12. Soviet Military Hints at Dissent on Arms Issue. *New York Times*, Dec. 2, 1974, quoting *Krasnaya Zvezda* of Dec. 1, 1974.
13. Osipov, V., Common Sense and Ulterior Motives. *Izvestia*, Dec. 4, 1974, translation in full by Novosti Press Agency.
14. For example, the *Washington Post*, *Baltimore Sun*, *New York Times*, *Philadelphia Inquirer*, *Christian Science Monitor*, *Los Angeles Express*, *Chicago Tribune*, *Washington Star News*, *Boston Globe*, *Philadelphia Bulletin*, etc.
15. Leitenberg, M., Soviet Secrecy and Negotiations on Strategic Weapon Arms Control and Disarmament. *Bulletin of Peace Proposals* (Oslo), 5, no. 4, 1974, pp. 377-380 and 6, no. 1, 1975.
16. Osnos, P., Soviets Sounding Rhapsodic on Virtues of Arms Accord. *Washington Post*, Dec. 6, 1974.
17. Weller, L. D., The Status of SALT: A Perspective. *Arms Control Today*, 4, no. 12, Dec. 1974, pp. 1-4; (Also see David Aaron's important article (ref. 24) on U.S. willingness to "bargain" on the Trident submarine or B-1 bomber systems. Thus major U.S. programs still in development were not considered by the U.S. matters for negotiation while Soviet ones were so considered.)
18. Newhouse, J., *Cold Dawn: The Story of SALT* (Holt, Rinehart and Winston, N.Y.) 1973, 302 pages.
19. Nitze, P. H., SALT, The Strategic Balance Between Hope and Skepticism. *Foreign Policy*, no. 17, Winter 1974, pp. 136-156.
20. MIRV Madness. *New York Times*, (Editorial), Jan. 24, 1975. (See also Vladivostok's Gaps. *New York Times*, (Editorial), Dec. 18, 1974).
21. Ruina, J., Arms Progress. *New York Times*, Dec. 23, 1974.
22. Record of Press Conference, The Secretary of State. Dec. 7, 1974, pp. 1-4.
23. Kissinger Sums Up '74 (Interview), *Newsweek*, Dec. 30, 1974, pp. 31-32.
24. Aaron, D., SALT, A New Concept. *Foreign Policy*, no. 17, Winter 1974, pp. 157-167.
25. Spurring the Arms Race, (Editorial), *New York Times*, Dec. 4, 1974.
26. The higher figure of 100 billion dollars has appeared in several *New York Times*' editorials and columns, for example, Dec. 9, 1974 and Jan. 23, 1975. The lower figure comes from a system by system compilation of the anticipated costs of strategic weapon programs either underway or under development (such as the Trident submarine system, the B-1 bomber, etc.). Part of the difference is probably accounted for by whether one assumes that the Joint Chiefs and the President will press for a successor to the U.S. Minuteman ICBM system, either as a new fixed-site land based system or as a mobile system.
27. Excerpts from Kissinger's Briefing on Arms Accord, *New York Times*, June 22, 1973; In Mr. Kissinger's "briefing" on the June 1973 U.S.-Soviet Accords on Nuclear Arms Talks, a provisional statement signed by President Nixon and Secretary Brezhnev for SALT-II, he twice mentioned the objective in a permanent agreement of not only limiting arms "but the objective of reducing arms": "Thirdly, it includes reduction as one of the objectives of the agreement and not simply limitation . . ." Now the Vladivostok accord suggests an agreement that is not "permanent", and has no reductions.

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